The Aztlander

Communicating the Americas

Maya Numbers and Computations with Ximena Catepillán January 9

Vol. 3, No. 1
January 2023

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The Aztlander

Communicating the Americas

Vol. 3, No. 1
January 2023

Welcome to *The Aztlander* !

Jam-packed with Scholarly Focus articles and up-coming zoom and in-person events!

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Greetings Aztlanders!

Welcome to your January issue of *The Aztlander*. We have alot of cool stuff to read and zooms we're announcing to keep you busy through the cool months!

Monday, January 9 • 8 PM EST • 7 PM CT

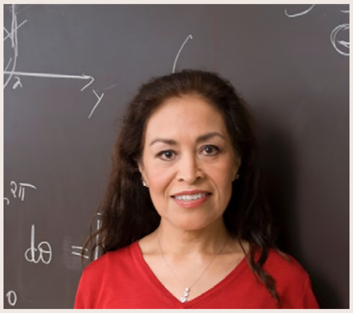
Our **January 2023** zoom event will feature **Ximena Catepillán** with a program titled:

"Maya Numbers and Computations"

Access this active hyperlink to join the event: https://us02web.zoom.us/j/83719166544

Ximena Catepillán, Emerita Professor of Mathematics at Millersville University, Pennsylvania, is passionate about Precolumbian-era mathematics. As a Chilean with ancestral roots throughout South America, she seeks to celebrate and memorialize indigenous peoples through the study of the relationship between mathematics and culture – ethnomathematics – systems which allowed ancient civilizations to describe, manage and understand reality.

Before attending graduate school in the United States, Ximena taught mathematics at Universidad de Magallanes in the Chilean Patagonia. In 1991, after earning a Master degree in Science and a PhD in Mathematics from The University of Iowa, Ximena began teaching mathematics at Millersville University.



Ximena Catepillán
Professor Emerita, College of Science & Technology, Millersville University

In 2006, Ximena began traveling to Maya sites with archaeologists. Soon after, Ed Barnhart, the director of the Maya Exploration Center, helped her create a course for non-math majors to be taught while visiting Maya sites. For the next fourteen years, Ximena hosted a study-abroad summer course on the mathematics and calendrics of the Maya for Millersville University students

In 2016, Ximena co-authored the textbook, *Mathematics in a Sample of Cultures*, with two chapters dedicated to Maya operations and calendric computations. She created a freshman seminar, *Culture, Science, and Mathematics in Precolumbian Cultures*, at Millersville University. A detailed description of her seminar was published in 2021, chapter 22 in the book *MAA PRESS Mathematical Themes in a First-Year Seminar*.

A chapter describing both courses was published in chapter 19 of the book *Mathematics Education, A Spectrum of Work in Mathematical Sciences Departments*, by Springer.It is available at: https://www.springer.com/series/13764. A graduate version of the course, for students of the master's in mathematics was co-developed with a colleague in 2014. The focus is the mathematics of the Maya. In 2021, she created and taught the seminar "*Etnomatemáticas*" for graduate students at Universidad de Santiago de Chile (USACH); the seminar focused on the mathematics and calendrics of the Maya.

Ximena is the Chair for the History of Mathematics Special Interest Group of the Mathematical Association of America (MAA), HOM-SIGMAA and an Associate Editor of the Convergence Journal of the MAA. She is also a member of the editorial board of the *Journal of Mathematics and Culture* (JMC), Revista Latino Americana de Etnomatemáticas (RLE), Revista Latino Americana Mathemáticas y Educación (RELIME), and Revista Morfismo (USACH).

Aztlander Scholarly Focus: Ximena Catepillán

Mesoamerican calendars were many and quite complex.There have been a good number of studies done to decipher them. By the arrival of Hernán Cortés in 1519 in what is current-day Mexico, there were 21 calendars in use while 4 of them were extinct. Using astronomical observations, the Maya developed an elaborate system of calendars, among them the Tzolkin Calendar, the Haab Calendar, the Calendar Round, which is a combination of the first two, and the Long Count. Which operations did the Maya use to perform their calendrical computations? While they used a vigesimal system to write the numbers, this system was never used in connection with days. No inscriptions use vigesimal numbers but rather quasi-vigesimal (chronological) numbers. In spoken numbers, a mix of decimal and vigesimal notation appears.

Perhaps multiplication by 20 was the most common computation. I will explain a simple method to multiply a Maya number by 20 as well as by a single digit. In addition, I will expand to a general multiplication method. Most calendar conversions were done using division which I will illustrate using an example of vigesimal division.

I'll illustrate calendrical computation within and among calendars and conversion examples in which division is needed, and that are simple enough to do with pencil and paper. A sample of them are included in the following list:

1) Find the Tzolkin day number given a Tzolkin date and vice-versa
2) Find the number of days between two Tzolkin dates
3) Find the Haab day number given a Haab date and vice-versa
4) Find the possible Tzolkin – Haab combinations
5) Find the Round Calendar date given a Long Count date
6) Find the Julian Calendar date given a Long Count date
7) Find the number of days between two Long Count dates
8) Find the number of days between two Round Calendar dates
9) Find the Long Count date of a given Round Calendar date
10) The Katun wheel

Maya Numbers and Computations

(a) **The spoken Yucatec numbers:**

The number names in one of the various Mayan languages, the Yucatec, are a combination of decimal and vigesimal systems. Look in the table of spoken numbers at the numbers 13 through 19, there is a decimal form within the vigesimal, since the numbers are formed by adding the numbers 3 through 9 to ten (***lahun***). The number 12, ***lahca***, is ***lahunca*** abbreviated.

In several Mayan languages, the word ***kal*** for 20 means "one score" and in others "one man". If we divide the number line in twenties, for example the number 42 is written ***ca tu y ox kal*** which translates as ***two added in the 3rd twentieth***, this is evident when looking at the number line. The number 79, ***bolon lahun tu y can kal***, is written ***nineteen added in the 4th twentieth***, just look at the 4th twentieth on the number line in the illustration on the next page (Catepillán et al, 2016).

Ximena and students play among the Thousand Columns in front of the Temple of the Warriors at Chichen Itza.

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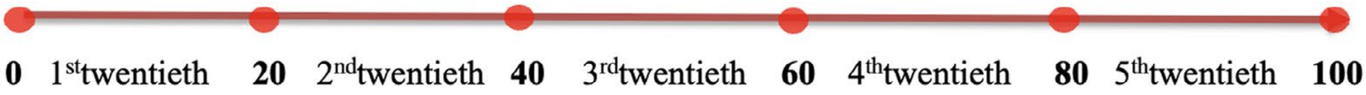
	Yucatec		Yucatec		Yucatec		Yucatec
1	hun	**14**	can lahun	**36**	uac lahun tu kal	**87**	uuc tu y ho kal
2	ca	**15**	hol hun	**40**	ca kal	**90**	lahun tu y ho kal
3	ox	**16**	uac lahun	**41**	hun tu y ox kal	**99**	bolon lahun tu y ho kal
4	can	**20**	hun kal	**42**	ca tu y ox kal	**100**	ho kal
5	ho	**21**	hun tu kal	**54**	can lahun tu y ox kal	**111**	buluc tu y uac kal
6	uac	**22**	ca tu kal	**59**	bolon lahun tu y ox kal	**120**	uac kal
7	uuc	**23**	ox tu kal	**60**	ox kal	**133**	ox lahun tu y uuc kal
8	uaxac	**30**	lahun ca kal	**61**	hun tu y can kal	**140**	uuc kal
9	bolon	**31**	buluc tu kal	**64**	can tu y can kal	**200**	lahun kal
10	lahun	**32**	lahca tu kal	**70**	lahun tu y can kal	**400**	hun bak
11	buluc	**33**	ox lahun tu kal	**79**	bolon lahun tu y can kal	**800**	ca bak
12	lahca	**34**	can lahun tu kal	**80**	can kal	**8,000**	hun pic
13	ox lahun	**35**	holhu ca kal	**81**	hun tu y ho kal	**160,000**	hun calab



Carlos Culebro wrote in *Lecturas Chiapanecas V,* 1992, that they also had a more complicated number system:

“The other system is very complicated; it is a skeleton, a skull which expresses the numbers one to twenty with different and complicated attachments that help distinguish the figures and the quantities from ten to twenty, that they must know very well so as not to make mistakes, and even more when there are multiples, because of the resemblance with the nominal and representative glyphs; its reading is difficult and is left to the experts. However, there are cases in which it is indispensable to know them, when a numeral of these is found as a coefficient on some date.”

The Spanish missionary Diego de Landa, infamously known for burning thousands of Maya books, and religious images, in his attempt to convert the Maya people to Christianity, wrote:

“*Their count is by fives up to twenty, and by twenties up to one hundred and by hundreds up to four hundred, and by four hundreds to eight thousand; and they used this method of counting very often in the cacao trading. They have other very long counts and they extend them in infinitum, counting the number 8000 twenty times, which makes 160,000; then again this 160,000 by twenty, and so on multiplying by 20, until they reach a number which cannot be counted. They make their counts on the ground or something smooth.*” (Tozzer, 1941)

Based on Landa’s statement, a grid will be used to perform multiplication and division among vigesimal numbers.

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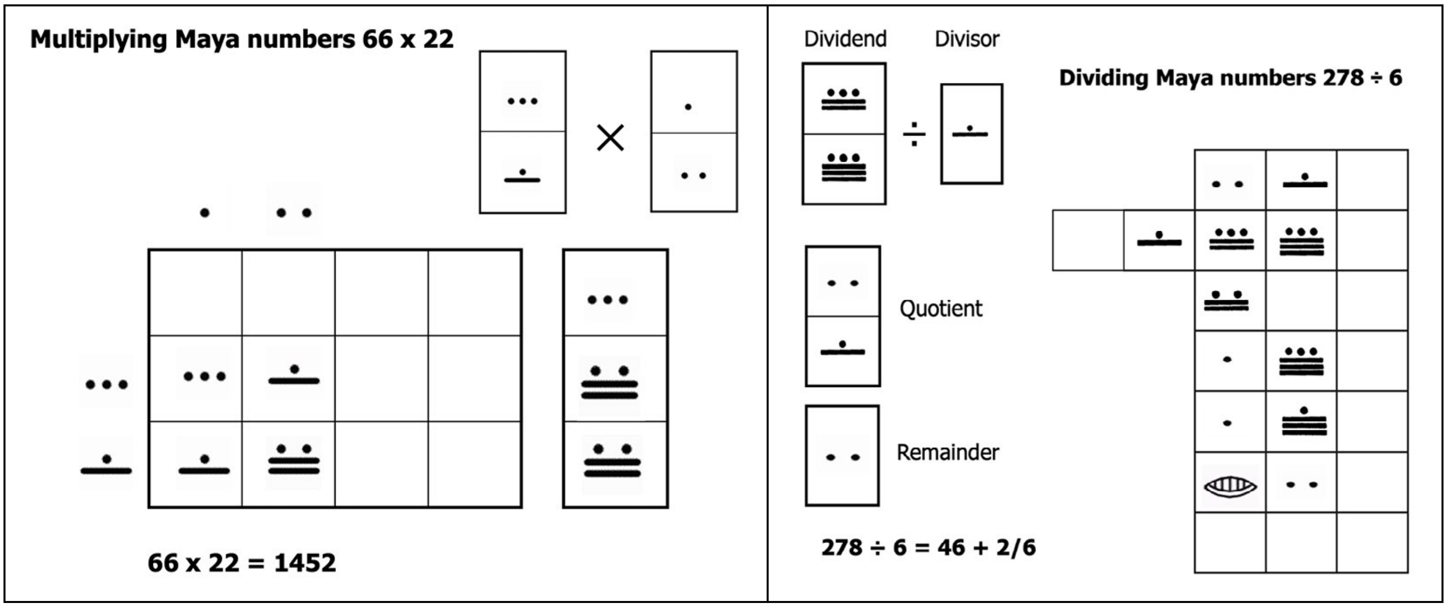
Here are two grid examples, one a vigesimal multiplication using Calderón's method and the other a vigesimal division (Catepillán).



(b) **The Tzolkin Calendar:**

The **Tzolkin Calendar** also called ***Sacred*** calendar, uses 13 numbers (trecena, 1 through 13) with 20 god names (veintena). The god names are Imix, Ik, Akbal, Kan, Chicchan, Cimi, Manik, Lamat, Muluc, Oc, Chuen, Eb, Ben, Ix, Men, Cib, Caban, Etznab, Cauac, and Ahau.

The dates go as follows: 1 Imix, 2 Ik, 3 Akbal,…, 13 Ben, 1 Ix, 2 Men, 3 Cib,…, 13 Ahau, a total of 260 dates since the numbers 13 and 20 have no common factors, and its least common multiple is 260.

To find the Tzolkin day number corresponding to a Tzolkin date like **4 Cauac**, we must find a number such that its remainder, when divided by 13 (trecena) is 4, and its remainder when divided by 20 (veintena) is 19, the god Cauac.

Mathematically speaking this means that we must simultaneously find remainders for divisions by 13 (trecena) and 20 (veintena). In other words, we must solve equations modulo 13 and modulo 20. Here the Chinese Remainder Theorem will provide us a simple formula. We do not know how the Maya did these operations; however, they must have had some form of division to do it.

Definition:

We say that ***a is congruent with b, modulo c***, denoted ***a = b mod(c)*** if *a* and *b* have the same remainder when divided by *c*, in other words, if *a* – *b* is a multiple of *c*.
(Think of clock arithmetic, 14 = 2 *mod*(12) because 14 hours is the same as 2 pm).

Definition:

We say that *p* and *q* are **coprimes** if the only positive integer that is a divisor of both of them is 1.

To simplify the computations and notation, we will use the following Theorem.

The Chinese Remainder Theorem:

Let p, q be coprimes. Then the system of equations:

$$y = a \bmod(p)$$
$$y = b \bmod(q)$$

has a unique solution for *y mod(pq)*.

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Proof:

Since p, q are coprimes, there exist k and s such that $kp + sq = 1$ and the solution y can be written as $y = asq + bkp$. This is because if we multiply $kp + sq = 1$ by y, we get

$$ykp + ysq = y,$$

and since $y = a \mod(p)$ and $y = b \mod(q)$, we have $y - a = up$ and $y - b = vq$,
thus,

$$ykp + ysq = y$$

can be written as

$$(b + vq)\,kp + (a + up)\,sq = y$$
$$bkp + vqkp + asq + upsq = y$$
$$(bkp + asq) + vkpq + uspq = y$$
$$(bkp + \ b) + (vk + us)\,pq = y$$
$$y - (bkp + asq) = (vk + us)\,pq$$
$$y = (bkp + asq) \mod(pq)$$

Hence, the solution y can be written as $y = bkp + asq \mod(pq)$.

Now, in the case of finding a Tzolkin date number, $p = 13$ and $q = 20$, which are coprimes, and in this case $k = -3$ and $s = 2$ because $kp + sq = (-3)13 + (2)\,20 = 1$, and we have the Tzolkin day number

$$y = bkp + asq = b(-3)13 + a(2)20 = 40\,a - 39\,b \mod (260).$$

Then, the Tzolkin day number formula (1) is,

$$\boxed{y = 40(\text{trecena number}) - 39(\text{veintena number}) \mod (260)}$$

Example:

Find the Tzolkin day number for the Tzolkin date **4 Cauac**.
Here the trecena number is 4, and the veintena is 19 since Cauac is the 19th god.
Thus, the Tzolkin day number is $y = 40(4) - 39(19) = 199$, and the day number is the 199th day.

Conversely, if we are given a Tzolkin date number w, we can find the Tzolkin date by dividing the number w by 13 and by 20, the remainders are the trecena and the veintena for the Tzolkin date.

Example:

Find the number of days between **3 Kan** and **7 Cimi**.
Kan is the 4th god, and Cimi is the 6th god (veintena).

The trecena difference is 4 and the veintena difference is 2.
We must solve the system,
$y = 4 \mod (13)$
$y = 2 \mod (20)$
And using, formula (1)

$$\boxed{y = 40(\text{trecena number}) - 39(\text{veintena number}) \mod (260)}$$

we get, $40(4) - 39(2) = 82 \mod (260)$.
There are 82 days between the two dates.

(c) The Haab Calendar:

The Haab Calendar consists of 18 gods (months) and 20 numbers (0 through 19), plus 5 special days called the Uayeb days. The gods' names are Pop, Uo, Zip, Zotz, Tzec, Xul, Yaxkin, Mol, Chen, Yax, Zac, Ceh, Mac, Kankin, Muan, Pax, Kayab, Cumku, and Uayeb.
The total number of days is 18 x 20 + 5 = 365, and are listed as follows:
0 Pop, 1 Pop, …, 19 Pop, 0 Uo, 1 Uo, …, 19 Uo, …, 0 Cumku, 1 Cumku, …,
19 Cumku, 0 Uayeb, …, 4 Uayeb.

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The Haab day number formula for the Haab date ***a god*** is (2)

$$\boxed{\mathbf{(\mathit{god}\ number - 1) \times 20 + (\mathit{a} + 1)}}$$

Example:

Find the Haab day number for **8 Cumku**
Since Cumku is the 18th month, the number is 17 x 20 + 9 = 349, the **349th** day of the Haab calendar.

Conversely, if we want to find a Haab date, for example, the date corresponding to the day number **232**, we keep in mind that the date is before the Uayeb, 232 = 11 x 20 + 12, hence day 12 on the 12th month, we write day 11 since the counting starts with 0.
The answer is **11 Ceh**

(d) The Calendar Round:

The Maya merged both calendars, the Tzolkin and the Haab, into a superior cycle known as the **Calendar Round**.

The **Calendar Round** has 18,980 days since

$$260 = 13 \times 2^2 \times 5,\ 365 = 73 \times 5, \text{ and the least common multiple between the numbers is:}$$

$$lcm(260,365) = 13 \times 2^2 \times 73 \times 5 = 18{,}980.$$

This means that only every 18,980 days, one of the 260 Tzolkin days coincides with another of the 365 days of the Haab again.

18,980 = 73 Tzolkin years = 52 Haab years = 73 x 260 = 52 x 365

Since the greatest common divisor is 5, *gcd*(260, 365) = 5, not all Tzolkin-Haab date combinations are possible.

Which are the possible date combinations?
The mythical Maya beginning is 4 Ahau 8 Cumku, using formulas (1) and (2) we have that 4 Ahau is the 160th day in the Tzolkin calendar and 8 Cumku is the 349th day in the Haab calendar. Moreover, 349 – 160 = 189 = 4 *mod* (5), and we have formula (3).

$$\boxed{\mathbf{(Haab\ date\ number) - (Tzolkin\ date\ number) = 4\ \mathit{mod}\ (5)}}$$

Using formula (3) and the date combination **4 Ahau 8 Cumku**, we can build a table with the possible Tzolkin – Haab combinations.

Tzolkin God	Haab number 0 - 19				Tzolkin God	Haab number 0 - 19			
Imix	4	9	14	19	Chuen	14	19	4	9
Ik	5	10	15	0	Eb	15	0	5	10
Akbal	6	11	16	1	Ben	16	1	6	11
Kan	7	12	17	2	Ix	17	2	7	12
Chicchan	8	13	18	3	Men	18	3	8	13
Cimi	9	14	19	4	Cib	19	4	9	14
Manik	10	15	0	5	Caban	0	5	10	15
Lamat	11	16	1	6	Etznab	1	6	11	16
Muluc	12	17	2	7	Cauac	2	7	12	17
Oc	13	18	3	8	Ahau	3	8	13	18

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To use the table on the previous page, let's take for example the Tzolkin god Imix. Every Tzolkin date ***n* Imix** is associated to the **4 Uayeb** date (Haab). This is because 4, 9, 14, and 19 are the only Haab numbers that go with Imix, and the Uayeb numbers are 0 through 4.

Thus, ***n* Imix 4 Uayeb**, $1 \le n \le 13$ are the only possible Round Calendar dates involving **Imix** and **Uayeb**.

Since 13 x 18 x 4 = 936, there are 936 + 13 = 949 Round Calendar dates involving Imix. To obtain the total Round Calendar dates we multiply by 20, thus, 949 x 20 = 18,980.

From the table we can see that **Imix**, **Cimi**, **Chuen** and **Cib** are the only Tzolkin gods that go with **4 Uayeb**

(e) Long Count Dates:

The Maya used the Long Count dates to mark events which occurred over long periods of time. The shortest period was the kin (day)

1 uinal = 20 kins
1 tun = 18 uinals = 360 kins
1 katun = 20 tuns = 7,200 kins
1 baktun = 20 katuns = 144,000 kins

For example, the Long Count date 9.12.2.0.16, that corresponds to July 5, 674 CE (*), tells us that 9 baktuns, 12 katuns, 2 tuns, 0 uinals, and 16 kins have elapsed since the mythical beginning of the first Maya era, 4 Ahau 8 Cumku 0.0.0.0.0, August 11, 3114 BCE.

The number of kins (days) is 9 x 144,000 + 12 x 7,200 + 2 x 360 + 0 x 20 + 16 = 1,383,136.

(f) Conversion from Long Count date to Round Calendar date:

We will use the following notation to write a Round Calendar date, (t, v, h) = (Tzolkin trecena, Tzolkin veintena, Haab day number).

Then, for **4 Ahau 8 Cumku** we have (4, 20, 349)

Let's find a formula to find the Round Calendar date number for a given Long Calendar date $n_5.\ n_4.\ n_3.\ n_2.\ n_1$ considering that day "zero" is **4 Ahau 8 Cumku** or $(t_0, v_0, h_0) = (4, 20, 349)$.

A Long Count $n_5.\ n_4.\ n_3.\ n_2.\ n_1$ has $144{,}000n_5 + 7{,}200n_4 + 360n_3 + 20n_2 + n_1$ days (kins).

Thus,

$t = t_0 + 144{,}000n_5 + 7{,}200n_4 + 360n_3 + 20n_2 + n_1 \mod (13)$

$\boldsymbol{t = t_0 - n_5 - 2n_4 - 4n_3 + 7n_2 + n_1 \mod (13)}$

$v = v_0 + 144{,}000n_5 + 7{,}200n_4 + 360n_3 + 20n_2 + n_1 \mod (20)$

$\boldsymbol{v = v_0 + n_1 \mod (20)}$

$h = h_0 + 144{,}000n_5 + 7{,}200n_4 + 360n_3 + 20n_2 + n_1 \mod (365)$

$\boldsymbol{h = h_0 + 190n_5 - 100n_4 - 5n_3 + 20n_2 + n_1 \mod (365)}$

In summary, formula (4)

$t = t_0 - n_5 - 2n_4 - 4n_3 + 7n_2 + n_1 \mod (13)$	**Tzolkin trecena**
$v = v_0 + n_1 \mod (20)$	**Tzolkin veintena**
$h = h_0 + 190n_5 - 100n_4 - 5n_3 + 20n_2 + n_1 \mod (365)$	**Haab day number**

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Example:

Given the long count date **8.14.3.1.12** find the corresponding Round Calendar date
This is the date found in the famous **Leiden Plaque**.

Here $n_5. n_4. n_3. n_2. n_1 = 8.14.3.1.12$
$n_5. n_4. n_3. n_2. n_1 = 144{,}000 \times 8 + 7{,}200 \times 14 + 360 \times 3 + 20 \times 1 + 12 = 1{,}253{,}912$ kins
A total of **1,253,912** kins after **4 Ahau 8 Cumku**.
Then,
$\boldsymbol{t} = 4 - n_5 - 2n_4 - 4n_3 + 7n_2 + n_1 = 4 - 8 - 28 - 12 + 7 + 12 = -25 = \mathbf{1}\ \boldsymbol{mod}\ \mathbf{(13)}$
$\boldsymbol{v} = 20 + n_1 = 20 + 12 = 32 = \mathbf{12}\ \boldsymbol{mod}\ \mathbf{(20)}$
$\boldsymbol{h} = 349 + 190n_5 - 100n_4 - 5n_3 + 20n_2 + n_1 = 349 + 190 \times 8 - 100 \times 14 - 5 \times 3 + 20 \times 1 + 12 =$
$486 = \mathbf{121}\ \boldsymbol{mod}\ \mathbf{(365)}$.

The 121st day of the Haab, or 6 months and 1 day, the first day of the seventh month, 0 Yaxkin.

1 Eb 0 Yaxkin (1, 12, 121)

(g) Find the number of days between two Round Calendar dates:

Given the Round Calendar dates (t_1, v_1, h_1) and (t_2, v_2, h_2)
Then, the trecena difference is $\Delta t = t_2 - t_1\ mod\ (13)$ and the veintena difference is $\Delta v = v_2 - v_1$ mod (20), therefore, using formula (1) we compute the number of Tzolkin days between the two dates as $40\Delta t - 39\Delta v\ mod\ (260)$.

Moreover, $\Delta h = h_2 - h_1\ mod\ (365)$ is the number of days between the two Haab dates. Using an alternative version of the Chinese Remainder Theorem, we can show formula (5) to compute RC, the number of days between (t_1, v_1, h_1) and (t_2, v_2, h_2) (Floyd Lounsbury, 1978).

$$\boxed{\mathbf{RC = 365(40\ \Delta \boldsymbol{t} - 39\ \Delta \boldsymbol{v}) - 364\ \Delta \boldsymbol{h}}\ \boldsymbol{mod}\ \mathbf{(18{,}980)}}$$

Example:

Stela 3, in Piedras Negras, Guatemala, focuses on Lady K'atun-Ajaw, her husband Yo'nal Ahk, and daughter Lady Huntan Ak (Precious Turtle).

The long count date **9.12.2.0.16**, corresponding to the Round Calendar date **5 Cib 14 Yaxkin** is the date in which Lady K'atun-Ajaw was born in a place called Namaan, between Piedras Negras, Guatemala and Yaxchilan, Mexico (Pitts, 2011).

Another date is **9.13.16.4.6**, corresponding to the Round Calendar date **4 Cimi 14 Uo**, in which she gave birth to Precious Turtle, Lady Huntan Ak.

How old was Lady K'atun-Ajaw when her daughter was born?

We must find the number of days between the Round Calendar dates **5 Cib 14 Yaxkin** and **4 Cimi 14 Uo**. These dates correspond to **(5, 16, 135)** and **(4, 6, 35)**.

Hence, using formula (5),
$\Delta t = 4 - 5 = -1 = 12\ mod\ (13)$
$\Delta v = 6 - 16 = -10 = 10\ mod\ (20)$
$\Delta h = 35 - 135 = -100 = 265\ mod\ (365)$
$RC = 365(40\ \Delta t - 39\ \Delta v) - 364\ \Delta h = 365(40 \times 12 - 39 \times 10) - 364 \times 265$
$= 365 \times 90 - 96{,}460 = -\ 63{,}610 = -\ 6{,}670 = \mathbf{12{,}310}\ \boldsymbol{mod}\ \mathbf{(18{,}980)}$

Therefore, Lady K'atun-Ajaw was 12,310 days old when her daughter was born.
Since $12{,}310 \div 365.2425 \approx 33.7$ years, she was mother at 33 years old.

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Note:

The problem could have been solved by finding the difference between the long count dates, as follows.

$$\begin{array}{rrrrrr} & 9. & 13. & 16. & 4. & 6 \\ - & 9. & 12. & 2. & 0. & 16 \\ \hline & 0. & 1. & 14. & 4. & -10 \end{array}$$

And since 1 uinal = 20 kins, we can rewrite the answer as 0.1.14.3.10.

This number is a distance number, it is not a long count date but a length of time, which when converted to number of kins we get 12,310 kins.

If we only had the Round Calendar dates, it would be easier to use formula (5).

(h) Find the Long Count date of a given Round Calendar date:

To do this operation we must find the number of days between 4 Ahau 8 Cumku and the given date; and convert to Long Count date.

Example: Find the Long Count date for the Round Calendar date 8 Etznab 11 Ceh (8, 18, 232)

We have **4 Ahau 8 Cumku** (4, 20, 349)
$\Delta t = 8 - 4 = 4 \text{ } mod \text{ } (13)$
$\Delta v = 18 - 20 = -2 = 18 \text{ } mod \text{ } (20)$
$\Delta h = 232 - 349 = -117 = 248 \text{ } mod \text{ } (365)$
RC = 365(40 x 4 – 39 x 18) – 364(248) = 365 x (-542) – 90,272 = -288,102 = -15 x 18,980 – 3,402 = **15,578** *mod* (18,980)
15,578 = 2 x 7,200 + 3 x 360 + 4 x 20 + 18

We obtain the Long Count date **2.3.4.18 *mod* (18,980)**. And since 15,578 + 98 x 18,980 = 13.0.10.0.18, this Long Count date also corresponds to the given date.

According to the Calendar Converter (*) **8 Etznab 11 Ceh** corresponds to **13.0.10.0.18**, and 1,875,618 days = 15,578 days *mod* (18,980)

(i) Find the corresponding Julian Calendar date for a given Long Count date:

(Michael Coe and Mark Van Stone, 2001)

Let's work with the Leiden Plaque's Long Count date 8.14.3.1.12
The number of kins is
8 x 144,000 + 14 x 7,200 + 3 x 360 + 1 x 20 + 12 = 1,253,912

If we use the **GMT** correlation constant 584,283 then, the Julian year is:

(1,253,912 + 584,283)/365.25 – 4712 = 320.703628, the year is 320

We subtracted 4712 because the Julian year began in 4713 BCE, and there is no year 0. To find the day and month we use the decimal part of 320.703628, multiply the number by 365.25, and use the table on the next page.

Since 0.703628 x 365.25 = 257.000127, the month is September and the 257th day of the year. However, 320 is Julian leap (it is divisible by 4), then we subtract 244 (February has 29 days in the year 320).

The day is the 13th because 257 – 244 = 13.

Julian date: September 13, 320 CE

Leiden Plaque (back)

continued on next page

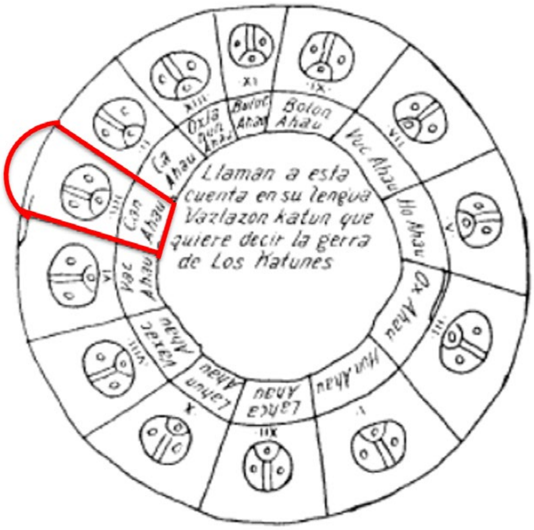
Aztlander Scholarly Focus: Ximena Catepillán

Maya Numbers and Computations

cont. from the previous page

Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
1	31	59	90	120	151	181	212	243	273	304	334	365
1	31	60	91	121	152	182	213	244	274	305	335	366

(j) The Katun Wheel:



Every chronological key period ends on an Ahau since the first ones ended in Ahau. The 13-Katun count records the Katun by the number of the day Ahau in which the previous Katun ended.

The **Katuns** end in 4 Ahau, 2 Ahau, 13 Ahau, 11 Ahau, 9 Ahau, 7 Ahau, 5 Ahau, 3 Ahau, 1 Ahau, 12 Ahau, 10 Ahau, 8 Ahau, 6 Ahau.

Example:

Let's find the Katun after Can Ahau.
Can Ahau + 1 Katun = 4 Ahau + 1 Katun = 4 Ahau + 7,200
And since 7,200 = 11 *mod* (13) and 7,200 = 0 *mod* (20)

We get, **4 Ahau**
+ 11
15 Ahau = **2 Ahau = Ca Ahau** (see figure)

Thus, 2 Ahau is the next Katun on the wheel.

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(*) Mayan Calendar Calculator, Maya Exploration Center
https://www.mayan-calendar.com/calc.html

Steve Radzi: Illustrator of Maya Archaeological Sites

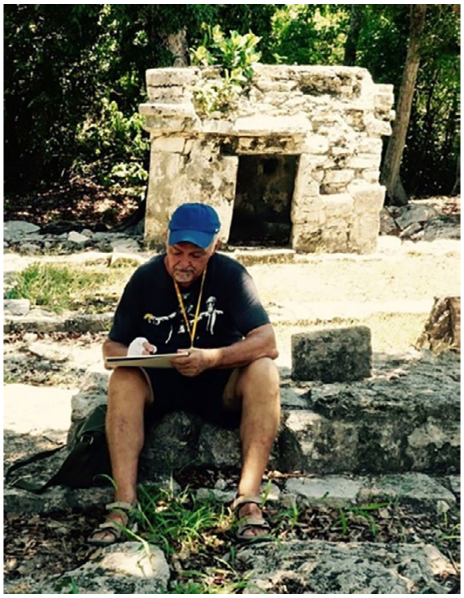
Over many years, renowned artist and illustrator Steve Radzi has contributed many fine illustrations from his travels for *The Aztlander* to illustrate specific points of interest relating to Mesoamerican culture and history that are often missing in ethnographic records. His material is held in high regard around the planet. He has become a good friend and we continue to collaborate regularly.

The Maya world has been of interest to many scholars, epigraphers, archaeologists, as well as artists. Steve Radzi is a professional illustrator. On the non-commercial side, his passion for illustrating remnants and ruins of bygone cultures has been a long-lasting affair. His travels through the Near and Far East with sketchbook in hand have resulted in a compilation of what he describes as "scribbles" of the world.

Steve's first encounters with Mesoamerican cultures began when he moved to North America from England. After working in the animation and comic book industries, his desire to explore led him to the jungles of Central America and to the Maya. His travels led him further to South America where he spent time in the Andes of Peru and the heart of Inca culture.

Upon his return in the early 1980s and with the Maya lands being only a short distance from Florida, his scribbling adventures through the Maya world began in earnest. He visited, as often as possible, the once grand cities of the Maya as well as the lesser-known structures hidden deep beneath the jungle canopy of Mexico, Belize, and Guatemala.

In the forth-coming series, Steve's illustrations will cover the coastal region of Yucatan, mainly around the Sian Ka'an Reserve and further south toward Belize. Many of the structures illustrated are from the Late Classic and Late Post Classic periods of Maya culture. Although several of the temple structures resemble the grand style of the Peten region, many are small and less known. Steve is most grateful to the intrepid folks that helped him find these structures, be they on the coast or close by in the jungles.



Steve immersed in work in the field.

Steve Radzi was born Stefan Radziwillowicz in Devon, England, of Polish parents. He is a television and film production illustrator with extensive experience in special event rendering, storyboard art, animation, and set design.

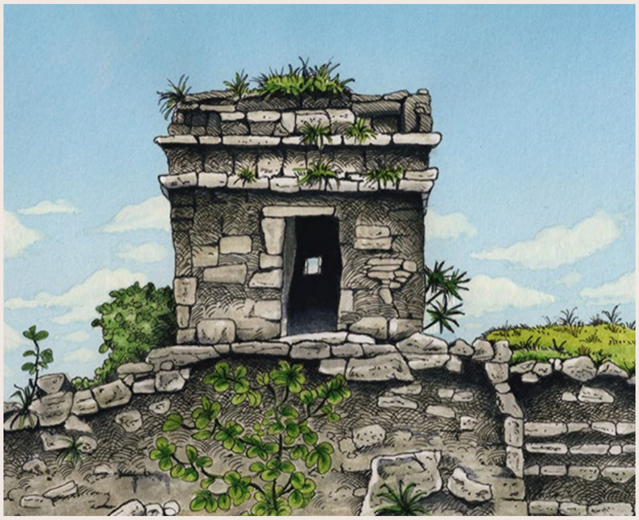
Steve designed the pre-production drawings for the animated feature film "The Hobbit" and eventually worked for Hanna-Barbera in Los Angeles working in the comic book division and the background art department on "Yogi's Space Race" and other cartoon favorites. He also hosted his own radio program on WDNA.FM Miami for 20 years. ■

The Maya World Illustrated

with artist Steve Radzi

Watch Tower Temple at Tulum, Mexico Unlike most Mayan sites, the one at Tulum was built like a fort. It was protected by walls that were up to 23-feet thick and 10 to 16 feet tall. Flanking its western perimeter were two Watch Tower Temples that guarded against intruders by land. This is the tower in the northwest corner called El Torreón. Inside of this temple is an altar.

Steve Radzi has been illustrating Maya sites for many years. His illustrations of Maya archaeological remains display a singular sensitivity and attention to detail. View a gallery of his work where prints are available at: www.mayavision.com ■



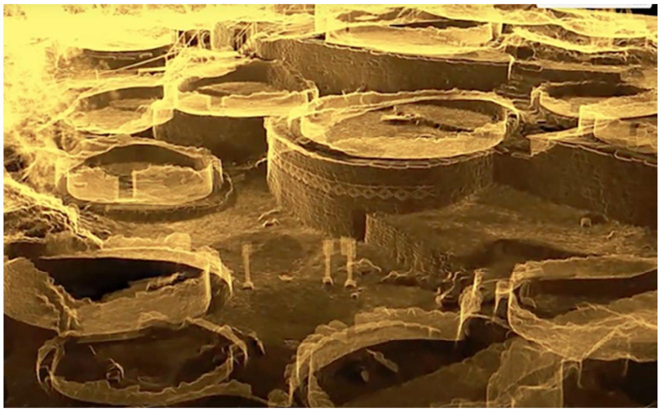
Noteworthy Posts in the News: South America

Endangered Peruvian Fortress Secured by Modern Mapping Methods

A 3D terrestrial laser scanner was deployed in Peru to create a high-resolution digital 3D terrain model of an ancient fortress. This is a good example of how advanced lidar technology forms a sound basis for the virtual preservation of cultural heritage monuments for future generations.

Kuélap is one of the largest ancient monuments in the Americas – and one of the most endangered. In spring 2022, the roughly 1,000-year-old fortification in northern Peru suffered massive damage from heavy rains in the Amazon.

The investigations in Kuelap attracted a great deal of attention from national and international heritage management and conservation institutions. The Peruvian Ministry of Culture, as well as delegates from UNESCO and the World Monuments Fund (WMF), which had placed Kuélap on its watch list in 2004 due to its continued deterioration, visited the site during the lidar research and personally saw for themselves that current actions are guiding further decisions on sustainable monitoring strategies for the endangered heritage site and providing a foundation for virtual conservation and accessibility for future generations.



The combined use of terrestrial and airborne mapping methods enabled the complete documentation of the Kuélap fortress.

GIM-International has their full report here: Endangered Peruvian Fortress Secured ■

Looking Towards the Future: Our Upcoming Aztlander Zooms

Monday, January 9 • 8 PM EST • 7 PM CT

Our **January, 2023** zoom event will feature **Ximena Catepillán** with a program titled:

"Maya Numbers and Computations"

Professor Emerita, Mathematics Department, College of Science & Technology, Millersville University

Monday, February 27 • 8 PM EST • 7 PM CT

Our **February, 2023** zoom event will feature **Brad Lepper** with a program titled:

"Interpreting Hopewell Artifacts Through the Lens of Historic and Contemporary American Indian Ceremonial Practices"

Senior Archaeologist, World Heritage Program, Ohio History Connection

Friday, March 17 • 8 PM EST • 7 PM CT

Our **March, 2023** zoom event will feature **Christine Eber** with a program titled:

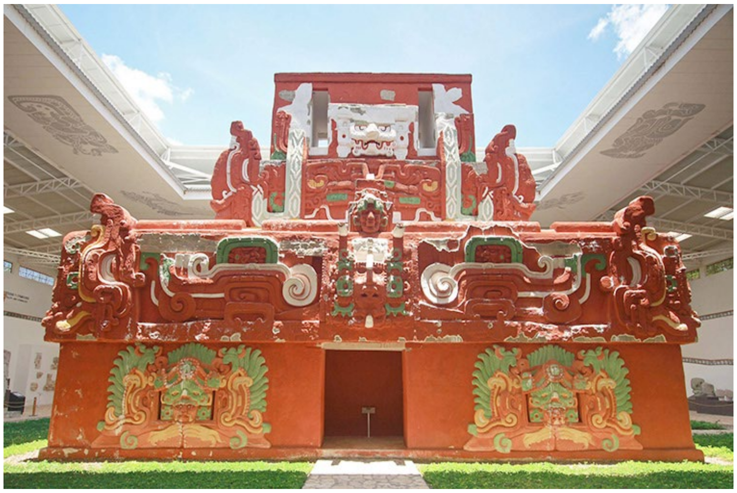
"Mesoamerican Weavers: Envy in times of struggle and hope. Challenges of working collectively in Chiapas, Mexico"

Professor Emerita, Department of Anthropology, New Mexico State University;
Director of **Weaving for Justice**, PhD from the State University of New York at Buffalo

Noteworthy Posts in the News: Janice Van Cleve

Saving Rosalila at Copan

Rosalila is a temple unique in the Maya world. When successive rulers built new structures over old ones, they usually destroyed the latter to recycle the materials. Rosalila, however, was so special to the Maya at Copan in Honduras that they carefully preserved it intact before burying it. Archaeologist Ricardo Agurcia discovered Rosalila some 30 years ago while tunneling under Temple 16. He found the 6th-century Maya temple complete with stucco moldings, rich colors, and ritual offerings. Obviously, this was a treasure worth preserving and a full-size full-color replica was constructed in the sculpture museum on site.



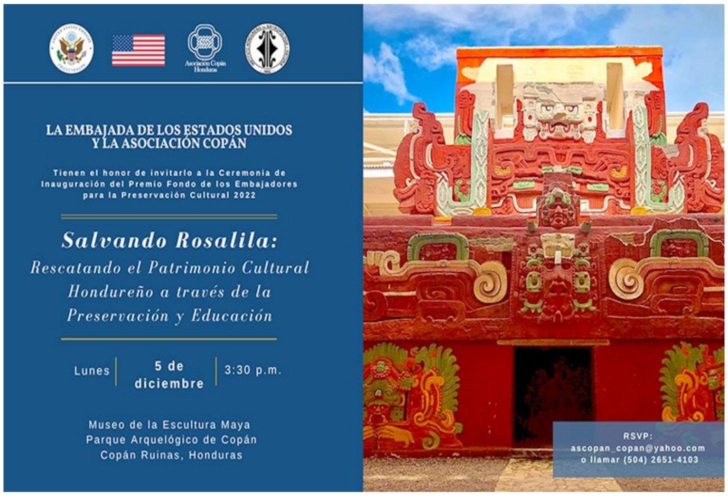
A reconstruction of Rosalila was built in the Museo de la Escultura Maya in Copan.

Although the original Rosalila is still under Temple 16, exposure to the elements from the tunnels has taken its toll. In particular, a hurricane in 2020 caused flooding and damage. Conservation became an emergency and the University of Nebraska, supported by Asociación Copán, came to the rescue. The first step was to map the temple and the maze of tunnels around it using lidar.

The task was not easy. Working deep underground in 90F degree heat and 90% humidity with little oxygen circulation challenged the team. Aside from the researchers, the field team included Elisandro Garza, a visiting scholar at Nebraska and current doctoral candidate at the City College of New York The story of the effort with photos and a video may be found at: [Huskers Help Power Mayan Temple Preservation]()

Ricardo Agurcia-Fasquelle (front), director of the Rescuing Rosalila Project at Copan, is pictured with University of Nebraska team members (from left, in back) Christine Wittich, Richard Wood, and Heather Richards-Risetto.

Asociación Copán was granted the largest cultural preservation grant Honduras has ever received for the conservation of Rosalila. Above, the grant ceremony.



LA EMBAJADA DE LOS ESTADOS UNIDOS
Y LA ASOCIACIÓN COPÁN

Tienen el honor de invitarlo a la Ceremonia de
Inauguración del Premio Fondo de los Embajadores
para la Preservación Cultural 2022

Salvando Rosalila:
Rescatando el Patrimonio Cultural
Hondureño a través de la
Preservación y Educación

Lunes | 5 de diciembre | 3:30 p.m.

Museo de la Escultura Maya
Parque Arquelógico de Copán
Copán Ruinas, Honduras

RSVP:
ascopan_copan@yahoo.com
o llamar (504) 2651-4103

Above, the invitation from the Embassy of the United States and Asociatión Copán inviting folks to attend the grant ceremony. ■

Of Sticks and Stones: Identifying Marks on the Palenque Cross (Part II)

by **Carl D. Callaway**, Austin Community College

Note: Part I appears in the December Aztlander

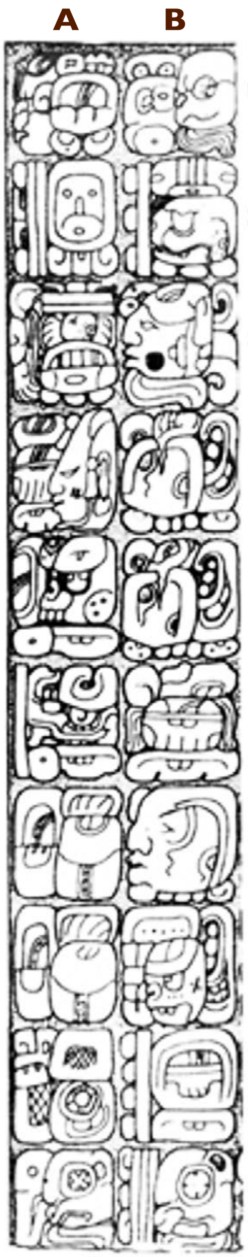


***Fig. 15**: Temple of the Inscriptions, Middle Panel, Glyph Blocks A1–B10.* ▶
Drawing by Linda Schele.

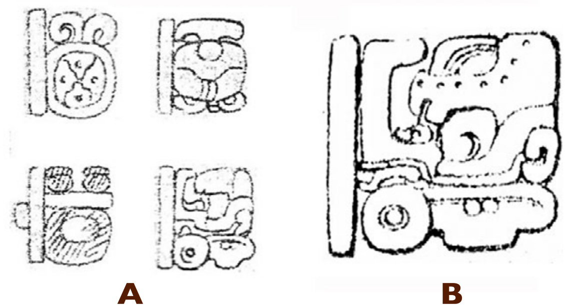


***Fig. 16**: Hieroglyphs Floating Beside the Base of the Cross on (A) The Temple of The Cross, Main Panel (after Maudslay 1899: Vol. IV, Plate 76); (B) Close Up of Lower, Right Hand Hieroglyph (after Maudslay 1889-1902: Vol. IV, Plate 77).*

Naming the Cross

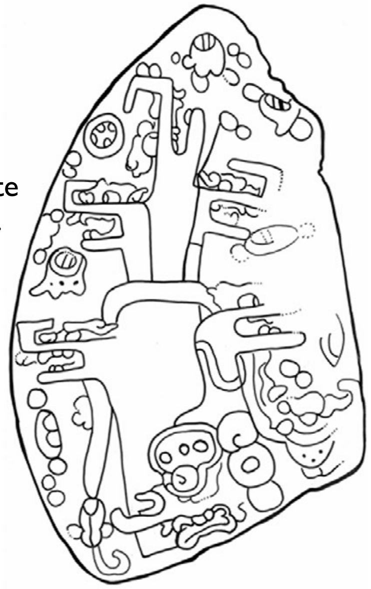
Columns A and B on the Middle Panel from Palenque's Temple of the Inscriptions reference events during the 11th K'atun which occurred under the reign of K'inich Janaab' Pakal I (***Fig. 15***). The primary subject matter of the passage is a poetic couplet describing the blooming of two bejeweled trees (Stuart 2006:116). The text implies that by the 11th K'atun, Palenque prospered under the leadership of Pakal and that prosperity brought great quantities of jade tribute (Guenter 2007:25-27). The historical record shows that Pakal was now on the offensive. The battles with neighboring polities surely served to secure Palenque's borders, and allowed Pakal the manpower and the enormous wealth to initiate the rebuilding of the main palace and his funerary tomb underneath the Temple of the Inscriptions. So, the 11th K'atun ushered in a period of revival, and with it, a flow of booty, tribute and the conscripted labor to fuel Palenque's construction boom. High on the list of tribute would have been precious jade in the form of masks, diadems, ear spools, nose ornaments, necklaces, chains and belts that served to make jewelry for adorning men and gods (David Stuart pers. comm. 2005). This influx of jade cargo is exactly what the initial passage alludes to:

Transliteration (Blocks A1-D1)

u-2-ta-la u-CHUM-[mu] TUUN-ni 12-AJAW
8-CHAK-SIHOM-ma u-11- WINIKHAAB'
AJAW-ni-ya [T24]-CHAN-na-IXIM ["SPROUT/SPLIT-EARTH"]-la-ja [T24]-UH-TE' ["SPROUT/SPLIT-EARTH"]-la-ja HO'-["SQUARE-NOSED-SERPENT FLOWER"]-TE' NAL-CHAN-na i-ka-tzi
KAB-la zi-ka-tzi u-ha-ja tu-pa-ja 9-CHAN-na
yo-OK-K'IN-ni 16-OK-K'IN-ni 9-TZ'AK-[b'u?]-AJAW

Translation

"The second tuun seating 12 Ajaw 8 Ceh, the 11th k'atun,
Twelve (Resplendent Sky Maize) became lord, sprouts
the resplendent jeweled tree, sprouts the five 'flower'
tree, its sky tribute, its earth tribute, jewels, ear flares,
Nine Sky Foot/Pillar? Day, Sixteen Foot/Pillar? Day,
the 9 (Many) Successor Lord."



▲ ***Fig. 17**: Incised Shell Pendant from Temple 21, Tomb V, Yaxchilan Showing the Five Branched Tree with Five Blossoms (Drawn by Carl Callaway after a photo in Akira 1990:72, Fig. 209).*

The 11th K'atun chronicle from Palenque's Temple of the Inscriptions Middle Panel features a passage wherein a recorded glyphic title, verbal action and the portrait of a bejeweled cross perfectly coincide. The text contains a poetic couplet that describes the flowering of two trees. The first tree to be named is the resplendent jeweled tree, a name fit for the bejeweled crosses depicted at Palenque (Stuart 2006:116). The second tree named is the five "flower" tree. Interestingly, the very same glyphic name appears at the base of the cross on the Temple of the Cross Panel (***Fig. 16A***) and on the Temple of the Foliated Cross as a hieroglyph floating with three other glyphs behind the main image (Stuart 1988; and Aldana 2004:299). A carved shell pendant from Yaxchilan from the burial of Lady Xok, Structure 21, Tomb V (***Fig 17***), depicts a likeness of the five "flower" tree radiating five branches with prominent square-nosed serpent blossoms flowering off its tips (Akira 1990:72, Fig. 209) and may be a corollary to the Palenque text.

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Of Sticks and Stones: Identifying Marks on the Palenque Cross (Part II)

by **Carl D. Callaway**, Austin Community College

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The Cross as a Ceiba Tree?

Scholars like Daniel G. Brinton (1868:95), Zelia Nuttall (1900:671-673) and Eduard Seler (1901–1902:16-17) noted early on that the cross at the Palenque was in fact a stylized tree and related to similar images of cardinal trees depicted in ancient Mexican manuscripts. Later scholars claimed that the Palenque cross was perhaps a portrait of a ceiba tree (Ruz Luillier 1963 103-122; De la Fuente 1965:135-139; and Greene and Thompson 1967:16) and were well aware of descriptions of mythical ceiba trees found in Post-Conquest manuscripts from Yucatan. The Books of Chilam Balam describe the ceiba as *ya'axche',* one of five trees that the gods erected during the creation of the world. The Book of Chilam Balam of Chumayel (Roys 1933:22) provides a detailed written account of the world-ordering that followed on the heels of a previous destruction when the Bakabs assigned a specific color, ceiba tree and bird to each cardinal station.

Yet, did the Maya intend to depict a ceiba tree at Palenque? Comparing actual tree features to the cross is telling. Maya artists may have conceptually personified the stamen of the ceiba flower or its aroma as a square-nosed serpent. Linda Schele (1992:154) pointed out how ceiba blossoms are remarkably similar to the square-nosed serpents located at the tips of the cross, proposing they are indeed personified stamens of ceiba flowers:

> "The flowers are white, five-petaled, with multiple stamens and a long, angled pistil. Moreover, the pollen sac at the end of the stamen has exactly the shape of the square-nosed serpent, and these open to emit pollen columns like jade beads"
> (Schele 1992:54).

The stamen of the ceiba flower arch backward into a square-nosed shape, visually correlating with the blossoms depicted at the end of the cross. As keen as this match is, one must proceed with caution. Not all square-nosed serpents depicted in Maya art are tree blossoms and the serpent head acts to vivify the tips of energetic flowing substances like blood, smoke, flower aroma and even the flowery breath of a departed soul (Stone and Zender 2011:99).

Noting other characteristics shared with ceiba trees extends Schele's analogy even further. The ceiba is among the tallest in the forest with large umbrella-shaped canopies reaching as high as 60m with mature branches that jut straight out from the trunk; and young ceiba trunks carry thorns to protect their polished green surface (Woodward 2005:1). The tree bark photosynthesizes like a leaf, turning sunlight into nutrients (***Fig. 18***). Artists depicted the Palenque cross as having stocky arms jutting straight out from the trunk spanning wide over the earth like an umbrella. The waxy-like green sheen of the young ceiba bark shares a striking similarity to the color and glossy surface of a polished jade, and this may be why the base of the cross sports a T1017 head and T24 "mirror" signs.

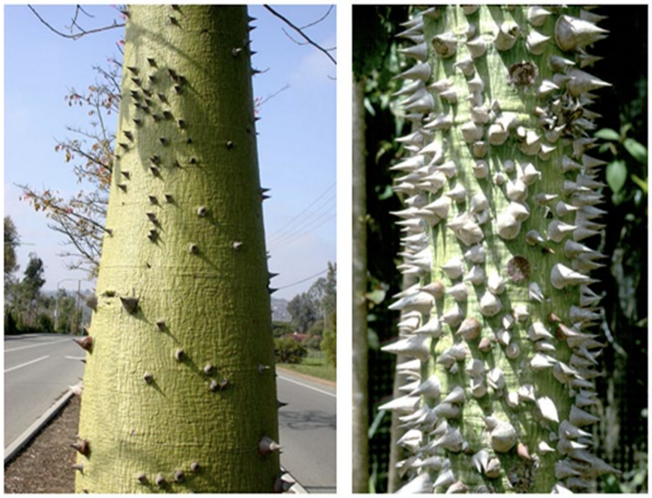

Fig. 18*: Examples of Glossy Green Trunks of a Young Ceiba.* Photos courtesy of Paul Johnson.

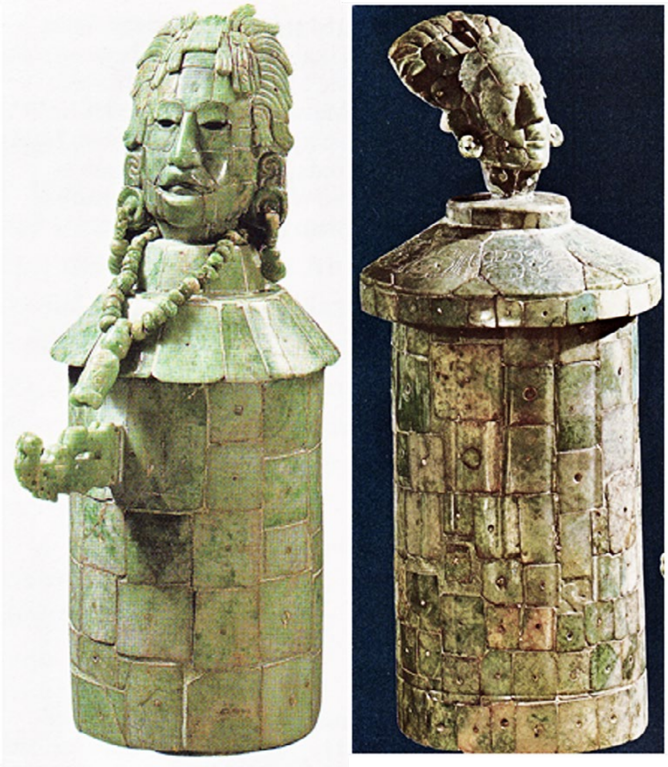

Fig. 19*: Jade Jars from Tikal (A) from Structure 5D-73, Burial 196 (after Martin and Grube 2000:48); (B) from Temple I, Burial 116 (after Coe 1975:794).*

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Of Sticks and Stones: Identifying Marks on the Palenque Cross (Part II)

by **Carl D. Callaway**,
Austin Community College

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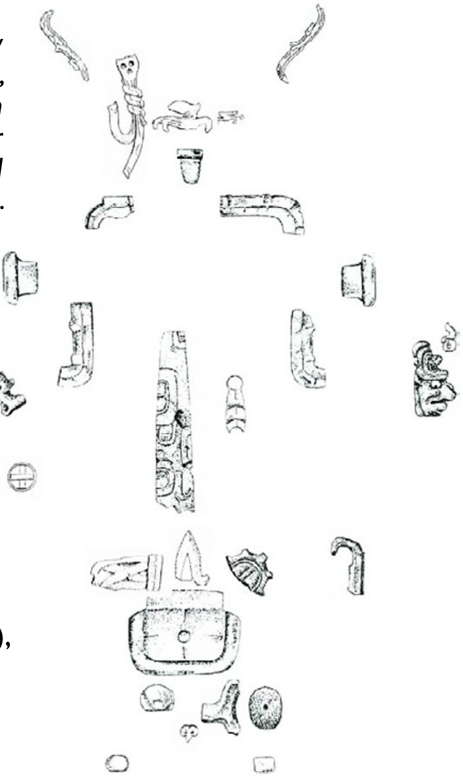

Fig. 20: *Preliminary Reconstruction of Palenque, Temple V, North Cache (reconstruction by Carl Callaway and Elisabeth Wagner based on drawings of fragments found by Ruz Lhuillier 1958: Figs. 12 &13).*

Mosaic Crosses

Reading the labels on the cross as both wood and jade, opens the possibility that the cross is a portrait of a tangible object, a model made from wood and stone. The stiff, angular posture of the cross and its straight contour lines may hint to a body comprised of four wood cylinders fitted with jade tesserae. Is there physical evidence for such manufacture? Cylindrical wood vessels with jade tesserae do exist in the archaeological record. Jade jars found in Tikal's Temple 73, Burial 196 and Burial 116 reflect a similar construction (Moholy-Nagy and Coe 2008: Figs. 92-97). These jars reveal the absolute mastery of Maya lapidaries who adhered jade tiles to the surface of wood cylinders. Each tile was drilled and set using adhesive, jade nails and a tiny jade plug. The jade cup from Burial 196 issues two bound "Square-Nose-Flowers" from its side (***Fig. 19***, previous page), clueing the viewer that the object is not just a cup, but also a condensed version of a flowering, jade tree.

Remarkably, mosaic fragments from actual jade trees do exist. Mosaics were excavated in Palenque Temple V, North Cache (Ruz 1958:281-284) and Río Azul Cache 3, Structure B-56 (Adams 1999:62). The Palenque cache was later identified by David Stuart as a Maya Cross (Stuart per. comm. 2006). The author's reconstruction of the Palenque Temple V, North Cache 9 (***Fig. 20***) shows it once displayed a full set of attributes, complete with K'IN bowl above an "earth monster mask," a tree trunk, flower cups, a draped serpent and Principle Bird Deity in the upper branches (Callaway 2006: 103-110). The body and flowers of each cross were carved from the most precious of all stones – pure jade. These examples of jade trees beg the question if Palenque artisans also fashioned a life-sized, 3-D mosaic of the cross, like the icon that K'inich Kan B'alam II pays homage to. What better way to project the wealth, pomp and power of a revitalized kingdom, than to construct a life-sized, mosaic statue from jade tribute?

Final Thoughts

The jutting branches, flowers and surface of the Palenque cross could identify it as a stylized ceiba tree. Analysis of the glyphic labels on its base identify it as a tree, made of wood with a polished blue-green surface, perhaps even a bejeweled mosaic of pure jade, with the title "resplendent, jeweled tree" reflecting a revitalized city under the patronage of K'inich Janaab' Pakal I during the florescence of the 11th K'atun.

In the final analysis, one can only partially reconstruct what the Maya of Palenque were trying to say about the cross. There is no ancient iconographer to guide us through its complex symbology. As a symbol, it will always possess a deep, enigmatic character with multivalent properties. The cross challenges each new viewer with a series of questions that lead to ideas beyond the grasp of present knowledge, recalling once again, explorer John L. Stephen's (1969:347) observation that, "This tablet of the cross has given rise to more learned speculations than perhaps any others at Palenque." Yet one thing is certain, over 200 years after its rediscovery, the cross stands as an icon of Maya artistry, offering shade and food for thought to all those who come to ponder beneath its resplendent arms.

Acknowledgments

I thank Dr. David Stuart for challenging me to reexamine the Maya Cross for a thesis topic and for generously offering his insights on the jade mosaic from Palenque's Temple V Cache. Dr. Stuart's advice and support were tremendously helpful in developing the core ideas of the thesis from which the current work derives. Also, I give deep thanks to Dr. Barbara MacLeod, not only for her fine edits, but for constantly encouraging me to think "outside the box" and in helping me to understand the finer points of the Classic Mayan grammar. I must also acknowledge Dr. Bob Wald who took time to review and comment on my hieroglyphic translations of Palenque texts. This article also benefited from innumerable discussions, past

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Of Sticks and Stones: Identifying Marks on the Palenque Cross (Part II)

by **Carl D. Callaway**,
Austin Community College *continued from previous page*

and present, on all things Maya with Dr. Erik Boot, Dr. Jeff Buechler, and Dr. Steve Bourget. I am especially grateful to Dr. Elisabeth Wagner who was instrumental in helping reassemble the Palenque Temple V Cache. I also thank Paul Johnson for his constant encouragement over the years and for providing me with his many wonderful photos of ceiba trees. I owe a great debt of gratitude to Justin Kerr who was most generous in providing me with many detailed images from his archive of Maya vases. Finally, I give thanks to Jim Reed for his unflagging support and aid in preparation of this article for publication.

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Aztlander Book Author Focus: Leonide Martin, RN, DPH

Award-winning author, retired University of California Professor, former Family Nurse Practitioner. Writes historical fiction and narrative nonfiction. Member of IMS, Maya Exploration Center, Solar Initiate, Maya Fire Woman.

After University retirement, I became fascinated by ancient Maya culture and began researching their history, archaeology, and spirituality. The ancient Mayas created the most highly advanced civilization in the Western hemisphere. Archaeologists were astonished by their monumental architecture, advanced technology, intricate hieroglyphs, and exquisite art. Deeper study aided by deciphering their written language revealed a high court lifestyle and complex culture, political alliances and enmities, amazingly accurate calendars, and prolific literature.

This fascination led to writing historical fiction about powerful Maya women – rulers, queens, priestesses, visionaries – who influenced their people's destiny. Through historical fiction my books bring the ancient Maya to life in stories about both real and fictional characters. My first novel about the Maya, *Dreaming the Maya Fifth Sun* (2006) weaves together the lives to two women, one a modern nurse and the other an ancient Maya priestess. It is based in part on my own experiences on a spiritual pilgrimage to Yucatan for spring equinox ceremonies. The ancient priestess' story is set in Tikal, Uxmal, and Chichen Itza; the two women's lives intertwine across the centuries involving 2012 equinox rituals important for the planet's future.

While living in Merida, Yucatan and studying with Maya elders, I visited many Maya sites and learned about sacred rituals and shamanic practices. At Palenque, a major tourist destination and considered the most beautiful Maya ruin, I first visited the tomb of the Red Queen (Temple XXIII) and was captivated by her story. Several years went into researching the dynasty and history of Palenque, including who might be the royal woman whose skeleton was covered in red cinnabar and interred there. When I learned that four women in family of K'inich Janaab Pakal, Palenque's greatest ruler – his grandmother, mother, wife, and daughter-in-law – were candidates, my imagination was sparked and I decided to write their stories. The 4-book series is titled "Mists of Palenque" and each book focuses on one of these women. They were among the most powerful women in ancient Americas, but few people have ever heard of them.

Yucatec Itza Elder Hunbatz Men.
Photo by Leonide Martin.

"Lennie" in Palenque, 2012. ▶

These women brought their city to new heights and influenced the Classic Maya world. I really admire these four remarkable "queens," and in telling their stories, my goal is to be accurate as possible about names, places, and events deciphered by Mayanists. I strive to recreate what ancient Maya life might have been, which requires some inference and imagination to fill in details. Hopefully, I've done justice to them in compelling dramas of the four great Maya queens of Palenque:

The Visionary Mayan Queen:
Yohl Ik'nal of Palenque (2016)

The Controversial Mayan Queen:
Sak K'uk of Palenque (2017)

The Mayan Red Queen:
Tz'aakb'u Ahau of Palenque (2018)

The Prophetic Mayan Queen:
K'inuuw Mat of Palenque (2019)

It was essential to study about the Maya from both scientific and indigenous viewpoints. During five years living in Merida, I apprenticed with Yucatec Itza Maya Elder Hunbatz Men, becoming a Solar Initiate and Maya Fire Woman. Other Maya teachers in Guatemala included Priestess-Daykeeper Aum Rak Sapper and Maya Elder Tata Pedro.

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Aztlander Book Author Focus: Leonide Martin, RN, DPH

The ancient Maya had a brilliant and mystical culture, and my books are dedicated to bringing readers an experience of their exotic world through authentic, compelling historical novels.

Book awards include:

Writer's Digest Award for Short Fiction, Silver Medal in Poynter Global Ebook Awards, Writer's Digest Honorable Mention in Historical Fiction, Writer's Digest 2nd and 3rd Annual Self-Published e-Book Awards, Midwest Book Review praise, Seattle Book Review praise, Amazon Top 100 Books, Amazon #1 in Historical Fiction-Romance-Ancient Worlds.

Mists of Palenque Series

Four Books about Maya Queens of Lakam Ha (Palenque), by Leonide Martin
Historical Fiction Set in Classic Maya Times...
Based on the Lives of Four Actual Ancient Maya Women.

Four women rose to prominence in one of the greatest cities of the ancient Maya, Lakam Ha (now called Palenque, in Chiapas, Mexico). Two were the first women rulers documented in Maya history, and the other two were wives of rulers who continued the dynasty. They had tremendous impact on the region; their images and accomplishments were carved on stone monuments and panels in temples and palaces.

Their lives were full of personal challenges and political struggles. Yet they were daughters, wives, sisters, and mothers with lives full of intrigue, passion, loss, and danger. Although Maya culture was complex and unique, their daily experiences were in many ways similar to women in all cultures and time periods. These stories of four Maya queens, based on archaeological research and historic events, vividly describe the common humanity yet unusual circumstances in their lives.

The stories of these remarkable women rulers lay buried for centuries under crumbling ruins lost in misty tropical jungles in southern Mexico. They were four of the most powerful women in the Americas, but few have heard of them. These strong women propelled the Palenque dynasty to heights of power and creativity, bringing their city to its apex during the Classic Period (500-700 CE). While living in Merida, Yucatan, Mexico, I became fascinated by these remarkable women and studied what is known of their histories. Carved images of them on panels or pillars, portrayed as ancestors or in the act of conveying symbols of rulership to their sons, sparked my curiosity. Hieroglyphic passages on several panels spoke briefly about their positions in the Palenque dynasty. It was enough to capture my imagination. I wanted to tell their stories, as richly and fully as possible, so a broader readership than archaeologists would know about them. This series about the great Maya Queens is the result. Each queen is brought to life in her own book, following historic and archaeological facts as much as possible.

To create interesting plots and flesh out their personalities, I added fictional characters and events. This involved a good deal of creative imagination; the motives and emotions and reactions of these characters, both actual and fictitious, are my interpretations. It is akin to reading between the lines of cryptic glyphs and evidence left in stones. I sincerely hope you enjoy these stories, learn something valuable about their advanced civilization, and come to admire the ancient Maya as a brilliant and sophisticated people.

Mists of Palenque Series Book 1:

The Visionary Mayan Queen: Yohl Ik'nal of Palenque

"**Heart of the North Wind**" was the first Maya woman who ruled in her own right. She was the last of her lineage, the only child of **Kan Bahlam I**, descended through the Jaguar (Bahlam) Dynasty of B'aakal. Her accession carved a new glyph in Maya history. A gifted visionary since childhood, she used her intuition to overcome political opponents and anticipate enemy attack. Despite betrayal and vengeance, through court

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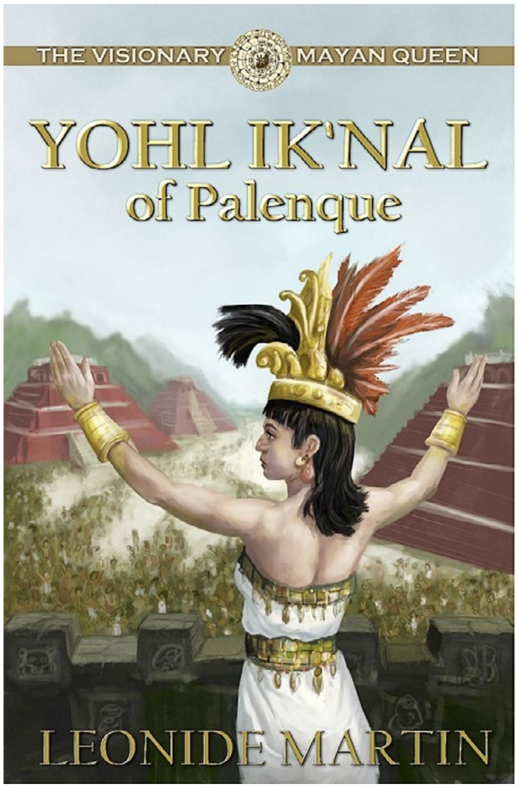
The Visionary Mayan Queen: Yohl Ik'nal of Palenque

continued

intrigues and personal crises, she preserved her dynasty and found a deeply satisfying relationship that sustained and supported her.

In misty tropical jungles 1500 years ago, a young Maya girl with visionary powers was destined to become the first woman ruler of B'aakal, a Classic Maya polity in southern Mexico. She was the last of her royal lineage, the only child of Kan Bahlam I, and her accession would fulfill his ambitions. Never before had a woman acceded to the throne of Lakam Ha (Palenque), dominant city of B'aakal, and powerful forces were allied against her. Her father immersed her in an intense training program and cultivated support among nobles, while his cousins plotted to overthrow his dynasty.



This book is available HERE

Yohl Ik'nal (Heart of North Wind) had to put aside her personal desires and relinquish the comfortable world of palace women to meet the challenges as royal heir. Her love for her father steeled her will and impelled her to master skills of rulership despite opposition. Her visioning powers allowed her to overcome political opponents and anticipate enemy attack, saving Lakam Ha from defeat. In the midst of betrayal and revenge, through court intrigues and regional clashes, she faced personal crises and found a deeply satisfying relationship that sustained her.

The first woman ruler of the ancient Maya, the first Queen of Lakam Ha, she built temples to honor her father and her gods. She protected her city and brought prosperity to her people. But she foresaw a time of darkness and devastation coming and she must choose to follow her own vision or bow to the will of the gods. Would her choice cause ruin or bring her city to greatness?

Her accession carved a new glyph in Maya history. The Bahlam (Jaguar) dynasty was preserved through her and propelled to heights of power and creativity. She was the grandmother of K'inich Janaab Pakal, called "Pakal the Great," the most famous Maya ruler. In 1952 his royal tomb was excavated, the richest Maya burial found and the equivalent of Egypt's King Tut. As more than one Mayanist said of her, "she must have been a remarkable woman." This story brings Yohl Ik'nal and her people authentically to life in extravagant court ceremonies, exotic customs, demanding self-sacrifice, shamanic rituals and intimacies of personal relationships.

Centuries later, modern archaeologist Francesca Nokom Gutierrez and her team at Palenque discover the royal burial of a crimson skeleton, possibly the first queen's tomb found. They believe this burial is connected with Pakal, but cannot identify who the interred person was, and whether male or female. Francesca begins to unravel a web connected to ancient Palenque that will change her life.

Depiction of Yohl Ik'nal on Pakal's Sarcophagus, Temple of the Inscriptions.

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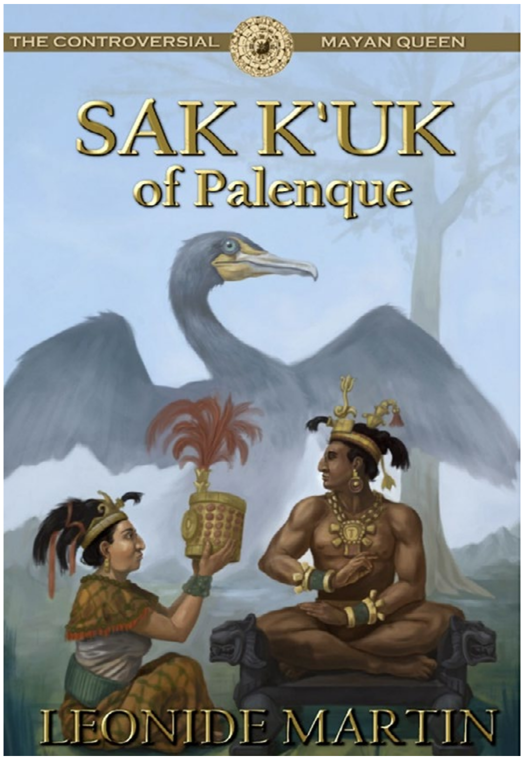
Aztlander Book Author Focus: Leonide Martin, RN, DPH

Mists of Palenque Series Book 2:

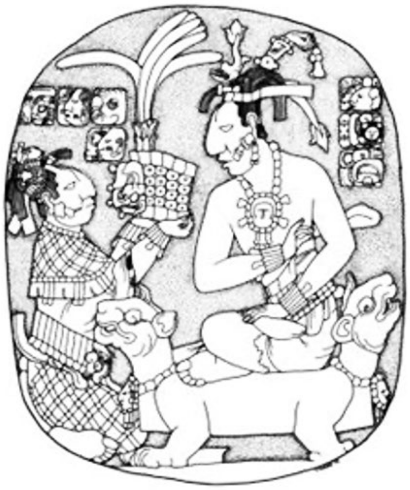
The Controversial Mayan Queen: Sak K'uk of Palenque

"**White Resplendent Quetzal**" was the daughter of Yohl Ik'nal and became the second woman ruler of Palenque. She acceded to the throne after Lakam Ha suffered a devastating attack from arch-enemy Kan (Kalakmul) that threw the city into chaos. Channeling the persona of Muwaan Mat, Maya Primordial Mother Goddess, she overcame rebellious nobles and steered her people through spiritual crisis following collapse of the portal to gods and ancestors. She retained rulership until her son was old enough to accede. **K'inich Janaab Pakal I**, "Sun-Faced Lord Shield" was her son, now the most famous Maya ruler known. In 1952, his tomb in the Temple of Inscriptions was excavated, the richest Maya burial found, compared to Egypt's King Tut. Sak K'uk and Pakal forged a special relationship through their trials that proved to be both a blessing and a curse.



This book is available HERE

In the ancient Maya world of towering stone cities amid dense tropical jungles, a strong-willed young woman struggles to preserve her family dynasty. Sak K'uk, daughter of the first woman Maya ruler Yohl Ik'nal, is more suited to accede than her artistic brother and she chafes at his lack-luster leadership. In visions, she sees that her son K'inich Janaab Pakal is destined to become the greatest ruler of Lakam Ha (Palenque), but how it will happen is uncertain. A sudden attack on Lakam Ha led by their archenemy the Kan dynasty, and plotted by vengeful Ek Chuuah, who was exiled by Sak K'uk's grandfather. The portal to Gods and Ancestors was destroyed. The royal family is humiliated; the capture and death of her brother and father leaves the city without leaders. With the sacred portal in collapse, the help of the Triad Gods cannot be attained.



Sak K'uk presents ruler's crown to her son, K'inich Janaab Pakal, Oval Tablet Palace House E.

In desperation, Sak K'uk undertakes perilous journeys into the Underworld to seek guidance. She meets Primordial Goddess Muwaan Mat who promises to co-rule with her until her son Pakal is old enough to accede. Can Sak K'uk convince dissident nobles to accept this joint rulership, when they are disillusioned with her family over the Kan defeat? All her willpower and skills are demanded to navigate through this spiritual crisis and hold the throne, so her son can fulfill his destiny to restore the collapsed portal. Through these intense trials, a special bond is forged between them that proves both a blessing and a curse.

Controversy arises among archaeologists about who exactly was ruler of Lakam Ha during this time. Some name Muwaan Mat or confound her name glyph with that of Sak K'uk. In this story, their identities fuse to restore stable governance to the city and begin rebuilding the destroyed portal to the Gods.

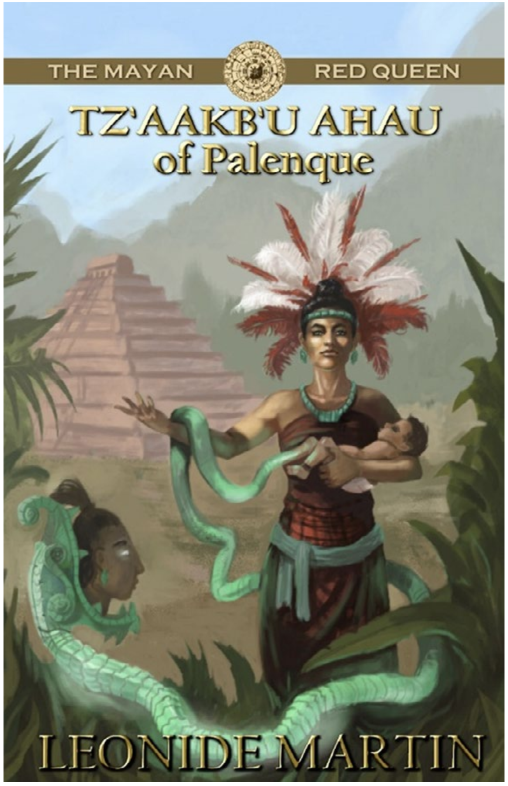
Muwaan Mat name glyph.

In modern times, archaeologist Francesca Nokom Gutierrez continues her quest to uncover the identity of the crimson skeleton found in the Temple XIII royal burial by her team at Palenque. They determined the skeleton was a woman whom they dub "The Red Queen" because of her cinnabar-permeated skeleton. But which queen she is remains elusive. Francesca is also perplexed by her grandmother's cryptic message to discover her true self by listening to the lightning in her blood.

Aztlander Book Author Focus: Leonide Martin, RN, DPH

Mists of Palenque Series Book 3:

The Mayan Red Queen: Tz'aakb'u Ahau of Palenque



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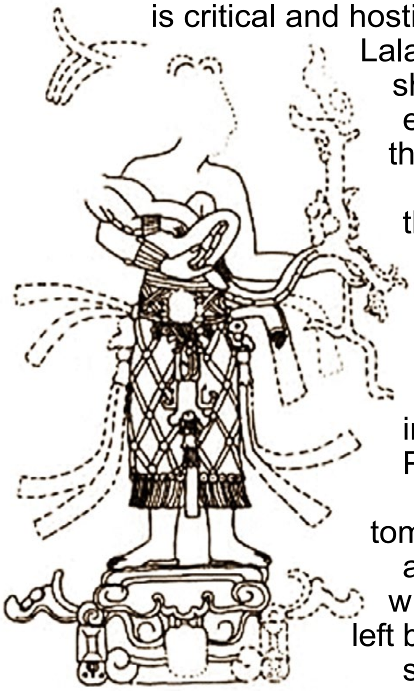
“**Accumulator of Rulers**” was Pakal’s wife. A shy, homely girl from a neighboring city, chosen for her noble bloodlines and political affiliations, she was overwhelmed by the sophisticated and complex society of Lakam Ha. She struggled to prove her worth to the jealous Queen Mother (Sak K'uk), while competing for Pakal’s heart. Bearing Pakal four sons who assured dynastic succession, she established her place in court and provided inspiration as the ruler restored spiritual portals and launched a creative zenith. She is the “**Mayan Red Queen**” whose tomb was discovered in Temple XIII, next to Pakal’s temple.

The ancient Maya city of Lakam Ha has a new, young ruler, K'inich Janaab Pakal. His mother and prior ruler, Sak K'uk, has selected his wife, later known as **The Red Queen**. Called Lalak, she is a shy and homely young woman from a nearby city who relates better to animals than people. She is chosen as Pakal’s wife because of her pristine lineage to B'aakal dynasty founders – but also because she is no beauty.

Arriving at Lakam Ha, she is overwhelmed by its sophisticated, complex society and expectations of the royal court. Her mother-in-law, Sak K'uk, is critical and hostile, resenting any intrusion between herself and her son. She chose Lalak to avoid being displaced in Pakal’s affections, and does everything she can to keep it this way. The official name she confers on Lalak exposes her view of the girl as a breeder of future rulers: **Tz'aabk'u Ahau**, the Accumulator of Lords who sets the royal succession.

Lalak struggles to find her place and prove her worth, discovering that she must also win Pakal’s love, since he is smitten by a beautiful woman, now banished from Lakam Ha by his mother. Pakal’s aesthetic tastes dampen his view of his homely wife. Lalak, however, is fated to play a pivotal role in Pakal’s mission to restore the spiritual portal to the Triad Gods that was destroyed in the devastating attack by archenemy Kan. Through learning sexual alchemy, Lalak brings the immense creative force of sacred union to rebuild the portal, but first Pakal must come to view his wife in a new light.

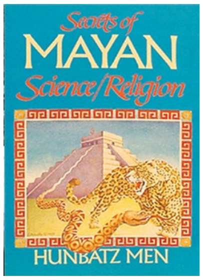
In modern times, ten years after the discovery of the Red Queen’s tomb, archaeologist Francesca Nokom Gutierrez is studying new research about this mysterious royal woman in Merida, Mexico. She teams up with British linguist Charlie Courtney to decipher an ancient manuscript left by her deceased grandmother. It provides clues about her grandmother’s secrets that send them to a remote Maya village, where they explore her family’s links to ancient Palenque.



Tz'aakb'u Ahau depicted on Tier C, Temple of the Inscriptions.

The article, with Book 4 continues on the next page

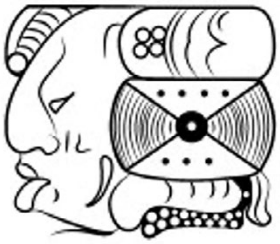
Editor’s interlude: Leonide and I have much in common, especially when it comes to Hunbatz Men and our appreciation of the ancient and modern Maya. I was so impressed with his book *Secrets of Mayan Science/Religion* that I traveled to Merida to seek him out. Lennie and I can’t remember the year, but when he organized the Solar Initiation tour with 260 participants, and when we got to Palenque, Hunbatz asked me to enter Pakal’s tomb first, to light copal incense for everyone.



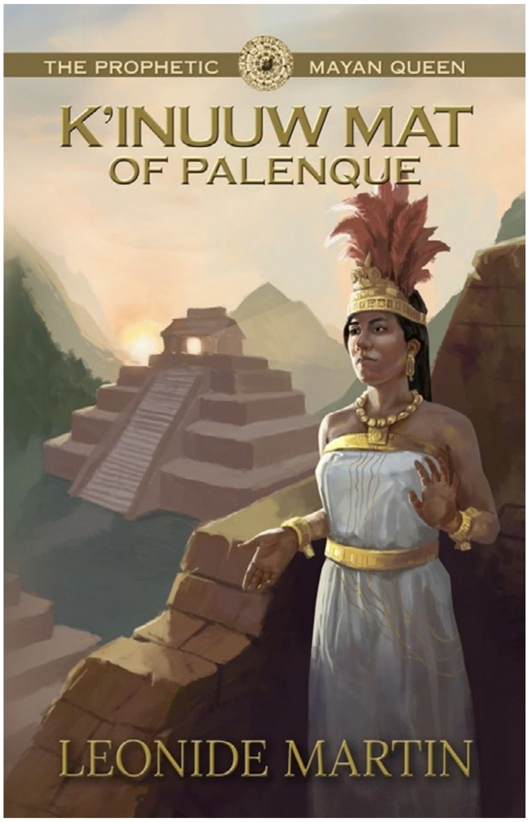
Aztlander Book Author Focus: Leonide Martin, RN, DPH

Mists of Palenque Series Book 4:

The Prophetic Mayan Queen: K'inuuw Mat



“**Sun-Possessed Cormorant**” was Pakal’s daughter-in-law, married to his fourth son. From this union came the only surviving descendant, continuing the Palenque dynasty. Controversy surrounded her relationship with **Kan Bahlam II**, Pakal’s first son whose brilliant calendar creations formed the basis for retaining elite power. Her son, **K'inich Ahkal Mo'Nab III**, was named Kan Bahlam’s successor. She became her son’s primary counselor, helping him deal with rapidly changing power structures as nobles gained more control over governance. Foreseeing the coming collapse of Classic Maya civilization, she mobilized resources to preserve their cultural heritage for future generations.



This book is available HERE

The four queens guided Lakam Ha through times of turmoil and tragedy into a golden age when their city became the vortex of Maya culture. With courage and determination, they faced personal and political challenges to win the hearts of kings, the admiration of their people, and to assure their royal dynasty.

Tiwol Chan Mat, Ahkal Mo' Nab, K'inuuw Mat on Tablet of the Slaves, Temple XVIII.

K'inuuw Mat is the last of the four Maya queens featured in this series. She married into the Palenque dynasty around 670 CE, at the height of their power. Her son became ruler and continued the dynasty.

She was born to serve the Goddess Ix Chel. But K'inuuw Mat is destined to continue the Lakam Ha dynasty by marriage to Tiwol Chan Mat, the fourth son of famous ruler **K'inich Janaab Pakal**. Because she trained in prophetic scrying on Cozumel, island of the Goddess, she sees the face of Pakal’s son with whom she will bear the dynastic heir – but it is not her husband’s image. Arriving at Lakam Ha for her marriage, she meets the man whose face she saw: her husband’s older brother, future ruler **Kan Bahlam II**. They are magnetically attracted and drawn together through shared astronomic skills. Though she resists, the force of their attraction propels them into forbidden embraces, until Kan Bahlam designs a bold plan that would solve his inability to produce a son – if he can gain his brother’s cooperation.

Set in the splendor of Lakam Ha’s artistic and scientific zenith, royal family conflicts and ambitions play out in a tapestry of brilliant Maya high culture. Their accomplishments in astronomy, arts, and sciences will astound people centuries later. Kan Bahlam creates the brilliant Cross Group depicting dynastic history and mythology, naming his nephew Ahkal Mo' Nab, son of K'inuuw Mat, as his heir. K'inuuw Mat must answer the Goddess’ mandate to save Maya wisdom and culture. Her complex relationship with Kan Bahlam leads to the son who carries on the dynasty, and a pale daughter who assists her as their civilization begins the decline and eventual collapse her prophetic vision foresees.

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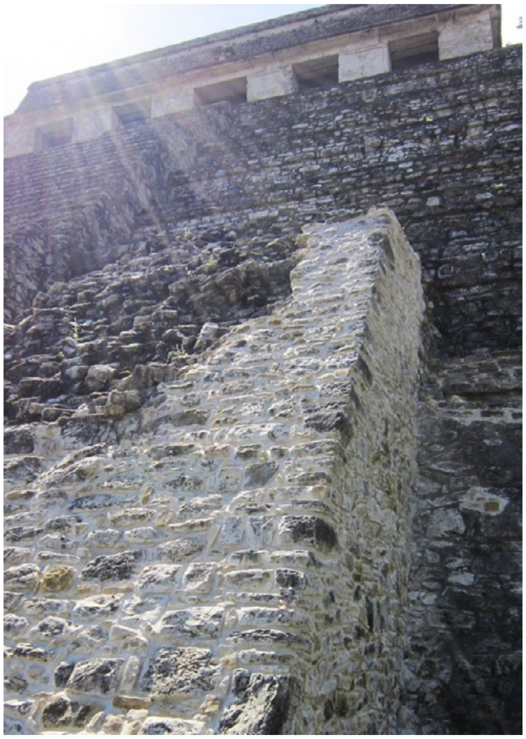
Aztlander Book Author Focus: **Leonide Martin, RN, DPH**

Contemporary Mexican archeologist Francesca Nokom Gutierrez and her partner Charlie Courtney, a British linguist, continue a quest to learn family secrets. They venture into Chiapas jungles to a remote Maya village, seeking to unravel her grandmother's cryptic messages and follow clues left in an ancient codex. The hostile village shaman holds the key, but refuses to share with outsiders. They pursue hints of the family scandal that leads to foreign blood and ancient Palenque lineages. Only by re-claiming her own shamanic heritage can Francesca learn the truth of who she is, and bring her dynasty into the present.

One great cycle rolls into the next... Thus it is. All comes to completion.

"Mists of Palenque" series tells the stories of strong and gifted woman. It also chronicles the accomplishments and challenges of the powerful men in their lives. The many strands in the series are brought together, including the relationship of first Maya woman ruler Yohl Ik'nal and the foreign woman Elie who she befriends. Elie, with blue eyes and yellow hair, came from foreign lands and lived among the Maya. She returns during the series for inter-dimensional contacts with Sak K'uk, Pakal, Tz'aakb'u Ahau. The links are completed between the ancient Mayas of Palenque and modern archaeologist Francesca Nokom Gutierrez, whose mixed Maya heritage leads her to study their history and seek answers to mysteries of her own family. As the Maya Great Cycle ends in 2012, she honors the transition to the next cycle with her family at the solstice solar phenomenon in the Cross Group of Palenque.



2012 solar phenomenon at Temple of the Inscriptions, Palenque.
Photo by Leonide Martin.

Reviews and Awards

Silver Medal Winner in Global Ebook Awards 2016 (*Mayan Red Queen*)

Dan Poynter's Global Ebook Awards are an honor for the best ebooks published. *The Mayan Red Queen* won the Silver Medal in the Historical Literature, Fiction – Ancient category in August 2016.

Midwest Book Review – 2015 (*Mayan Red Queen*)

"As Lalak struggles with her evolving relationships with son and mother-in-law, she also comes into her own abilities... When (Pakal) embarks on a spiritual quest to rebuild a connection to the gods, she discovers a sexual mysticism that will change not just their relationship, but the world... Under Martin's hand the Maya world and its underlying influences come alive, making for a thriller highly recommended for readers who also enjoy stories of archaeological wonders."

– Diane Donovan, Editor and Senior Reviewer

Midwest Book Review – October 2018 (*Prophetic Mayan Queen*)

"Readers who have enjoyed the other books in this series will find an even more compelling story in *The Prophetic Mayan Queen*…Mothers, wives, daughters, and priestesses have all risen to power and strength in different ways in each of these books… these insights on Maya spirituality and culture are exceptional in their scope and complexity… brings ancient Maya culture to life through the viewpoints of its leaders, powerful women and men who are on the cusp of experiencing a collapse of their ideals and world… a fictional tale that is engrossing, well-detailed, and supported by Martin's detailed studies into Maya culture and cosmology… a fitting and wonderful addition to an increasingly authoritative series. *– Diane Donovan, Senior Reviewer*

Seek out Leonide and her books on her website or social media: https://leonidemartin.com
www.linkedin.com/in/leonide-martin-41ba0757/ https://www.facebook.com/leonide.martin ■

An Ancient Horizon Calendar Comes Into View

Long before Europeans colonized North America, the Indigenous peoples in the valley where Mexico City would later arise may have followed a natural solar calendar that was so accurate it accounted for leap years.

The "horizon calendar," proposed in a new study, relied on natural landmarks in the valley's rugged eastern mountains, and was kept in sync with the astronomical year by a temple atop a sacred volcano. The system may have been used by the Aztec culture, which flourished in the area from roughly 1300 to 1500, though previous civilizations also referred to the horizon to tell time.

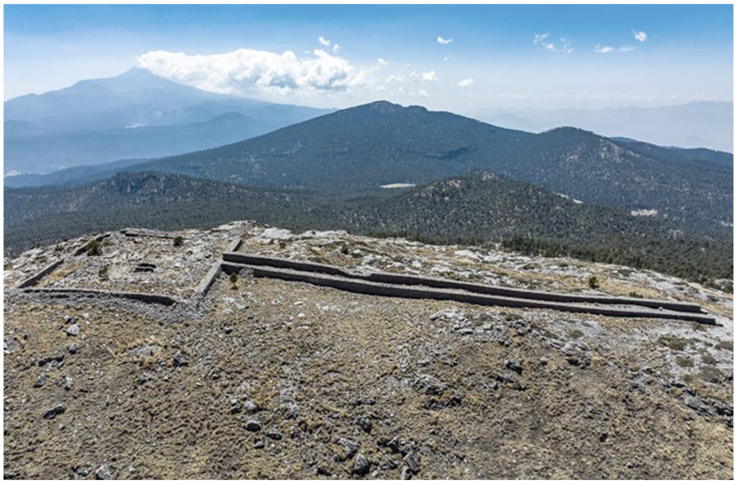
Earth's trip around the sun isn't divided into 365 perfectly discrete days. Every year, there is an extra quarter of a day. Failing to account for that time can add up, disrupting a civilization's calendar. Tracking the days was a concern in the valley, known as the Basin of Mexico, where as many as three million people lived before Europeans arrived, making it among the most populated regions on the planet at the time. With so many mouths to feed, corn farmers had to time their planting precisely.

While the Mesoamerican peoples lacked compasses, quadrants or astrolabes, their method for keeping their agricultural calendar may have been hiding in plain sight around the basin, said Exequiel Ezcurra, a distinguished professor of ecology at the University of California, Riverside, and an author of the study, which was published in *The Proceedings of the National Academy of Sciences*.

The researchers also trekked up to the remains of a temple on Mount Tlaloc to watch the sun rise over an ancient causeway, which they believe may have been a celestial marker of the Mesoamerican new year that could have been used to make leap-year adjustments.

"This long stone causeway aligns with the sun exactly on Feb. 23, or Feb. 24, with a little variation from one year to the next, which is exactly the time in which the Aztec calendar started," Dr. Ezcurra said.

The rising sun viewed from the stone causeway of the solar observatory in Mount Tlaloc, Mexico, which aligns with the rising sun on Feb. 23 and 24, in coincidence with a Mesoamerican new year date. Photo credit: Ben Meissner.



Mount Tlaloc's solar observatory. Photo: Ben Meissner.

That result, he said, is "exciting" because it "means that they were not only using observation points from the bottom of the basin against the mountains, but they were able to construct an observatory on the summit of the mountain that had the same alignments that they were getting from the bottom."

Anthony Aveni, professor emeritus of astronomy, anthropology and Native American studies at Colgate University in Hamilton, NY, called the new work "a solid, well-documented contribution to Mesoamerican astronomy."

The basin's mountains are "telling us stories of cultural evolution in the past that have become lost," Dr. Ezcurra said.

The **New York Times** has their report here: *An Ancient Horizon Calendar Comes Into View* ■

Watchful Cat and a Slithering Snake Among 2,000-Year-Old Drawings Found in Peru

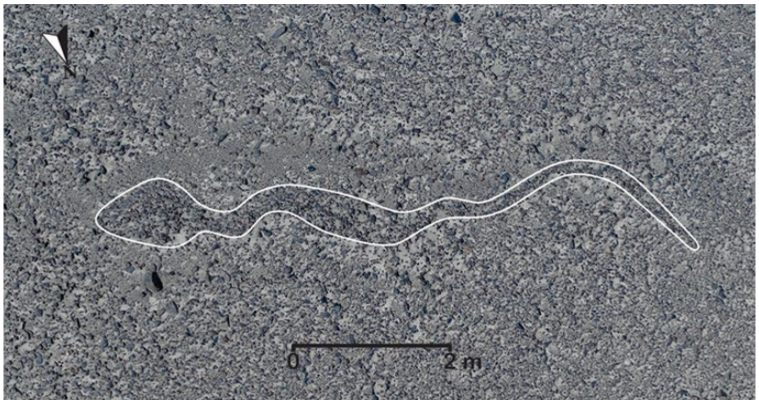
Archaeologists Found 168 More Geoglyphs, In the Desert Near Nazca

A rabbit-looking creature soars across the desert of southern Peru surrounded by numerous other geoglyphs. These geoglyphs – one of the greatest mysteries in archaeology – have drawn awe and intrigue for years. Now, researchers discovered over 160 more of them.

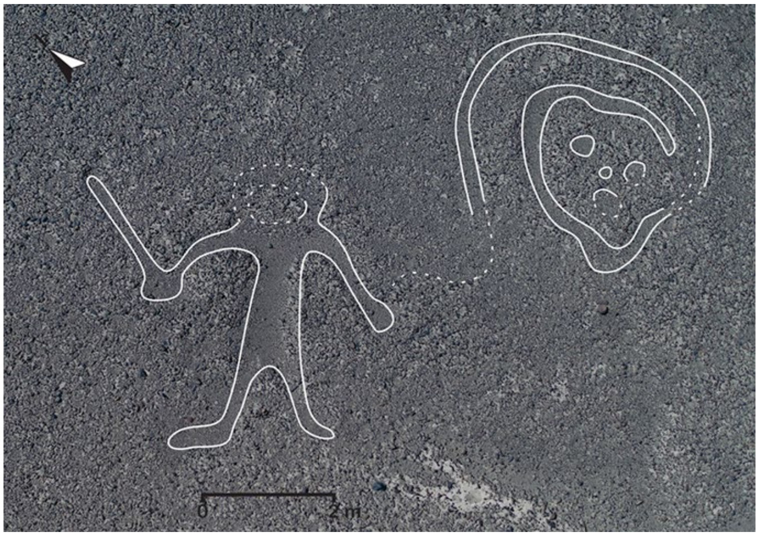
Japanese archaeologists studying the desert around Nazca, Peru, identified 168 new geoglyphs, according to a news release from Yamagata University.

Geoglyphs look like massive line drawings carved into the ground, photos show. The newly discovered drawings are about 2,000 years old, dating between 100 BCE. and 300 CE.

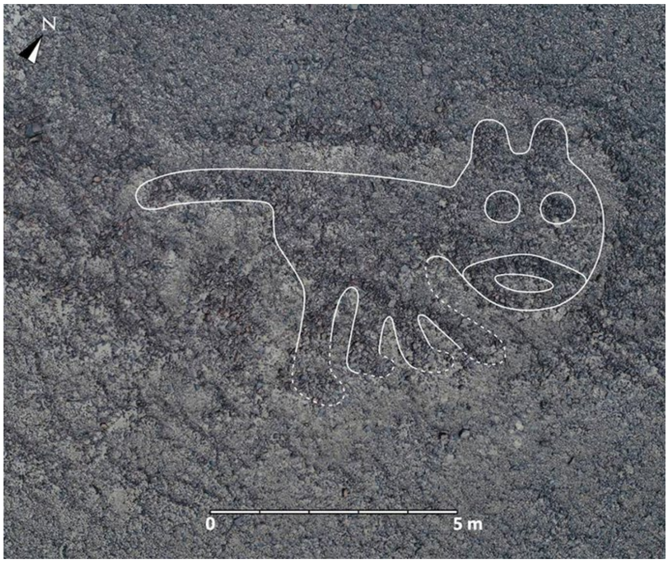
The **Miami Herald** has a nice article by Aspen Pflughoeft here: *168 More Geoglphs Found in Peru*



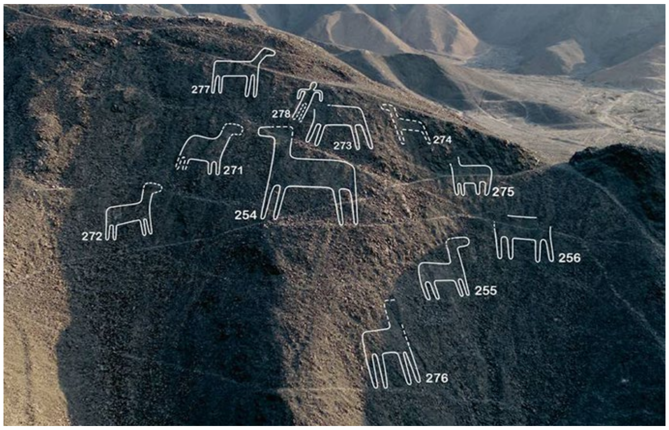
A snake geoglyph. All photos from Yamagata University.



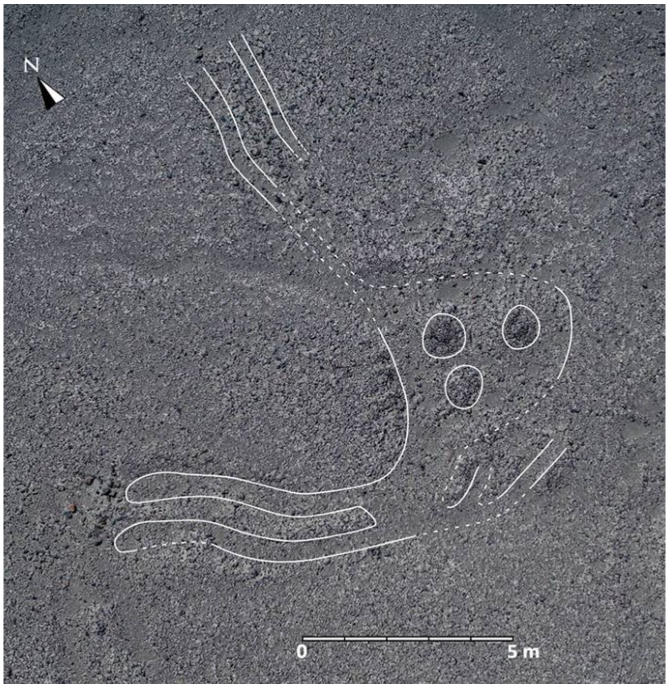
Geoglyphs of a human figure and abstract swirl.



A geoglyph of a cat.



A human and numerous animal line drawings.



A rabbit-looking geoglyph.

Upcoming Zoom and In-Person Events for January

Mondays, January 9-March 27
6:30–8:30 PM Arizona MST

Old Pueblo Archaeology Center's

"The Mogollon Culture of the US Southwest"

with archaeologist **Allen Dart**, RPA

This is Old Pueblo Arcchaeology Center's 12-session online adult education class.

Some Mogollon pottery: Mimbres Black-on-white, Four Mile Polychrome, Reserve Black-on-white, Mogollon Red-on-brown, and San Francisco Red.

Allen Dart teaches this class in 12 two-hour sessions on Monday evenings, to explore the archaeology of the ancient Mogollon culture of the American Southwest. The class covers the history of Mogollon archaeology, Mogollon origins, the complex subregional Mogollon "branches," chronology of habitation, subsistence and settlement patterns through time, artifacts, rock art, religious and social organization, depopulation and movement, and descendant peoples. Fees apply. Register by email at: info@oldpueblo.org

January 10 • 6–7 PM Arizona MST

Archaeology Café Online • Free

"The Chinese Railroad Worker Experience in Terrace, Utah"

Lecture by **Christopher Merritt** and **Karen Kwan** presented by Archaeology Southwest (ASW), Tucson

Illustration courtesy of Archaeology Southwest (ASW)

Christopher Merritt and **Karen Kwan** will discuss how the Bureau of Land Management, Utah State Historic Preservation Office, and other partners together with the Chinese descendant community have partnered over the last few years to investigate the historical and archaeological legacy of the Transcontinental Railroad in northwestern Utah. Two years of archaeological investigations at an abandoned railroad ghost town's Chinatown have uncovered significant archaeological information and helped to connect living descendant communities to this important story..

To register, click here: *Chinese Railroad Workers*

January 6 • 7 pm ET / 6 pm CT Pre-Columbian Society of Washington D.C. Zoom

"Gault and the Peopling of the Americas Myth"

by **D. Clark Wernecke**, PhD, Director (ret.), Prehistory Research Project, University of Texas at Austin

This meeting is free and open to the public but you must pre-register. Click *HERE* to register.

Getting to deep levels in excavations at the Gault site.

Recent discoveries, including the Gault Archaeological Site, have triggered a paradigm shift regarding the earliest peoples in the Americas. Though a number of researchers over the years publicly doubted the mainstream idea that the Clovis culture represented the first peoples in the New World, the excavations at Monte Verde, Chile, in the 1970s changed the nature and tenor of the arguments. For the first time many archaeologists agreed that a site met the rules of evidence showing human occupation in the Western Hemisphere prior to Clovis. As more evidence surfaced and older sites were re-examined, we were forced to revise the story of the peopling of the Americas. Paradigm shifts are messy, and we still have nearly as many questions as answers but it is clear that we need to more closely test new hypotheses for the peopling of the Americas.

Clark Wernecke, PhD, is the retired Director of the Prehistory Research Project at the University of Texas at Austin and the nonprofit Gault School of Archaeological Research. Dr. Wernecke started his academic career with a degree in history from Southern Methodist University followed by an MBA from Northwestern University, a MA in Anthropology from Florida Atlantic, and finally his PhD from the University of Texas at Austin. He came back to archaeology after a career in business and has worked in the Middle East, Mesoamerica, the American Southeast and Southwest, and Texas.

Upcoming Zoom and In-Person Events for January

January 11 • 12:00 PM ET

George Washington University, Washington DC Zoom

"Early Nasca Textile as a 365-Day Calendar"

As a part of our online interview series for The Textile Museum Journal, contributing scholar **Lois Martin** will discuss her studies of an exquisite 2000-year-old early Nasca textile known as the "Brooklyn Museum textile."

Access this hyperlink to register for the event:

Early Nasca Textile as a 365-Day Calendar

January 14 • 1:30 PM ET

The Precolumbian Society at the University of Pennsylvania Museum of Archaeology and Anthropology Zoom

"Patolli Game Boards: Maya, Teotihuacan, Toltec, Mixtec, Aztec"

with **Dr. Nicholas Hellmuth**

Access this hyperlink to join in the event:

Patolli Game Boards

January 19 • 7 PM MST

Old Pueblo Archaeology Center's "Third Thursday Food for Thought" • Free

"The Fremont Frontier: Southwestern Cousins or Great Basin Copycats?"

by Archaeologist **Katie K. Richards**, Ph.D.

Dr. Richards argues that Fremont is best understood when resituated as the northern periphery of the Southwest. Access this link to register for the event:

Southwestern Cousins or Great Basin Copycats

January 13 • 7 PM CT

Maya Society of Minnesota Zoom

"Classic Maya Underworld Iconography and Ritual Activities in Petroglyph Cave, Belize"

with **Dorie Reents-Budet**,
Research Associate, Smithsonian Institution,
and **Barbara MacLeod**, Independent Scholar

This talk examines the archaeological remains within the framework of Classic Maya (250-850 CE) iconography and hieroglyphic texts as well as ethnohistoric and ethnographic information on Maya cave usage.

Access this hyperlink to register for the event:

Iconography and Ritual Activities in Petroglyph Cave

Wednesday, January 18 • 8 PM ET

Institute of Maya Studies Zoom

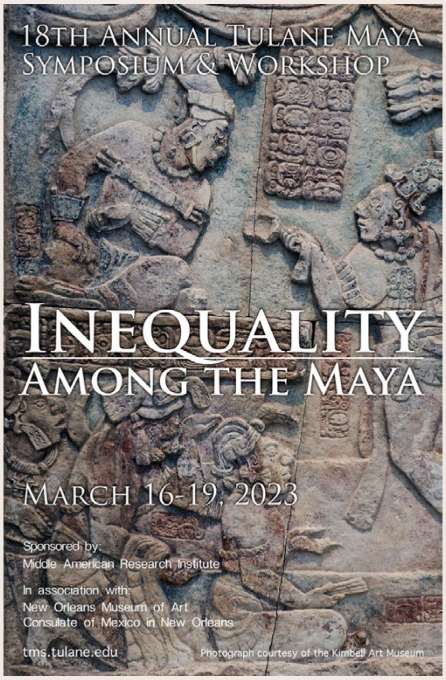
"The Art and Science of Classic Maya Pottery"

with **Dorie Reents-Budet**,
Research Associate, National Museum of Natural History, Smithsonian Institution

Recent results from the Maya Ceramics Project will be presented. The project features nuclear chemistry and art historical analysis combined with archaeological and hieroglyphic data. The purpose is to discern patterns of ceramic production and exchange to address questions of pottery production and socio-political interaction. Dorie works together on the Maya Ceramics Project with **Ronald L. Bishop**, Curator Emeritus, National Museum of Natural History, Smithsonian Institution..

Access this hyperlink to join in the event:

The Art and Science of Classic Maya Pottery


18TH ANNUAL TULANE MAYA SYMPOSIUM & WORKSHOP
INEQUALITY
AMONG THE MAYA
MARCH 16-19, 2023
Sponsored by:
Middle American Research Institute
In association with:
New Orleans Museum of Art
Consulate of Mexico in New Orleans
tms.tulane.edu
Photograph courtesy of the Kimbell Art Museum

The 2023 Tulane Maya Symposium

"Inequality Among the Maya"

March 16-19, 2023

We are pleased to announce that the **2023 Tulane Maya Symposium & Workshop** registrations are open!

An early registration discount is available until February 10th, 2023 (early registration is FREE for students). Save the date and stay tuned for the full program and more announcements soon.

Visit *2023 Tulane Maya Symposium for updates and more info!*

Speakers announced so far incude:
Scott Hutson, University of Kentucky; Claudia Chávez Argüelles, Tulane University; Kerry Hull, Brigham Young University; Amy Thompson, The University of Texas at Austin; Patricia A. McAnany, University of North Carolina at Chapel Hill; Jessica L. Munson, Lycoming College; and John F. Chuchiak IV, Missouri State University.

To register; visit *Tulane Maya Symposium Registration*

Noteworthy Posts in the News: Ancient Americas

A Critical Assessment of Claims That Human Footprints in the Lake Otero Basin, New Mexico Date to the Last Glacial Maximum

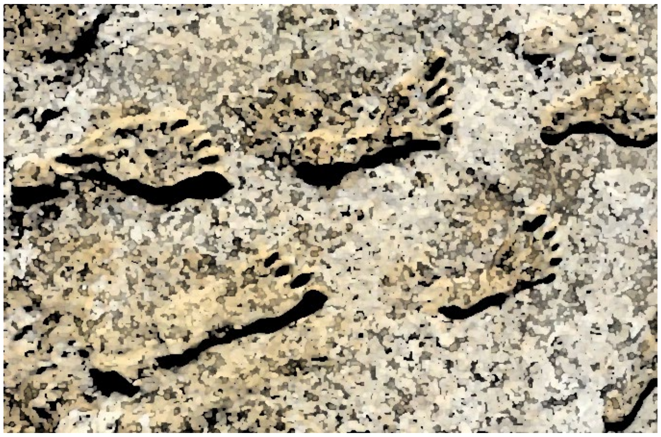


Image Credit: Jeff Pigati & Kathleen Springer, USGS.

The ancient human footprints in valley-bottom sediments in Tularosa Valley, New Mexico, are fascinating and potentially important because they suggest interactions between Pleistocene megafauna as well as great antiquity. The dating of those footprints is crucial in interpretations of when humans first came to North America from Asia, but the ages have larger uncertainties than has been reported. Some of that uncertainty is related to the possibility of a radiocarbon reservoir in the water in which the dated propagules of *Ruppia cirrhosa* grew.

As a test of that possibility, *Ruppia* specimens collected in 1947 from nearby Malpais Spring returned a radiocarbon age of ca. 7400 cal yr BP. We think it would be appropriate to devise and implement independent means for dating the footprints, thus lowering the uncertainty in the proposed age of the footprints and leading to a better understanding of when humans first arrived in the Americas. The authors of the paper are: Charles G. Oviatt, David B. Madsen, David Rhode, and Loren G. Davis.

The scholarly paper was published by **Cambridge University Press** and is availble: *Ice Age Footprints Under Critical Assessment* ■

Alignment, Artifacts Connect Indiana's Angel Mounds to Ohio's Hopewell Culture

by **Brad Lepper**

Mound A at Angel Mounds State Historic Site in southwestern Indiana. Photo: Danny Simmons.

Angel Mounds, located along the Ohio River in southwestern Indiana, was an important center of the Mississippian culture between about 1000 CE and 1450. This ancient American Indigenous town sprawled across more than 100 acres and by 1200 CE may have been home to as many as 3,000 people.

Elizabeth Watts Malouchos, with the Illinois State Archaeological Survey, led an investigation of Angel Mounds that revealed important connections to the Hopewell culture that preceded Angel Mounds by nearly a millennium. Results of her team's research appeared last year in the *Journal of Archaeological Science: Reports*.

According to Watts Malouchos and her colleagues, Mound A's lunar alignment likely indicates a religious connection with Cahokia, the argest city in the Mississippian world, which also has lunar alignments encoded into its architecture.

The "Angel Axis" alignment has been found at other Mississippian culture sites across southwestern Indiana. Watts Malouchos and colleagues determined, for example, that nearly one fourth of the residential structures at sites in the region surrounding Angel Mounds also were aligned to the northern minimum moonset. These alignments, which are found in both religious and secular architecture, served to connect the Mississippian people to cosmic rhythms, but they also may represent a link to the traditions of their ancestors in the middle Ohio valley..

The Columbus Dispatch has the full report here: *Connections Among the Hopewell Culture*

AZT Program Note: **Brad Lepper** who is the Senior Archaeologist for the Ohio History Connection's World Heritage Program, will be our AZT live-streaming presenter on February 27. ■

Important Programs You May Have Missed

Chicago Archaeolgical Society

Dr. Raff's talk to the Chicago Archaeological Society was so good and so filled with Pre-Clovis genetic information, since paleo-genetics is her scientific field, that I want all of you to have a chance to see the recording of her presentation. – Michael Ruggeri

"The Movement of Peoples Into and Through the Americas"

by **Dr. Jennifer Raff** of University of Kansas and author of the recent book:

Origin: A Genetic History of the Americas

Click here to watch: *The Movement of Peoples Into and Through the Americas*

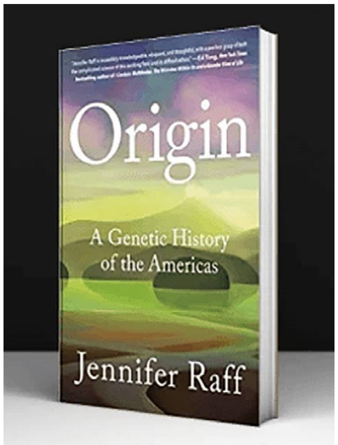
(After a little set up delay, the talk begins at 7 minutes into the video.)

CAS Lecture, submitted by Mike Ruggeri

The continuing story of the First Americans is being determined by many fields of research. Tradition, Archaeology, Linguistics, Biology, and Genetics. Dr. Raff's field is genetics. She works in a lab that is completely sterilized from outside contamination through many scientific methods. Her research is focused on the paleo-genetics of the first into the Americas from Asia. She described the Clovis First theory that dominated the field for so long. The theory then that the First Americans entered from Asia into he Americas through an ice free corridor at 9500-11,500 BCE. And then two of the first Pre-Clovis sites to be discovered and researched; Monte Alban in Chile, and The Page-Ladson site in Florida, Proving that humans entered the Americas before the Clovis period.

Dr. Raff's research is to discover the genetics of these first people to arrive and how they arrived. What genetic evidence is there to trace the genome lines back to Asian populations, and how did they split from one another over time as they entered the Americas. She explained the Beringian standstill historically as a land formation between Asia and the Americas whose population was blocked from the Americas by way of gigantic ice sheets and glaciers. Eventually, as the ice receded, the relatives of the Clovis people were able to enter the Americas.

But recent genetic research shows that folks living in southern Bering were able to leave the Beringian area by pushing out to the south and down the Pacific coast of the Americas before the Clovis population entered through the ice free corridor. During this period of time, genetic mixing began to occur between different populations in Berinigia and East Asia ands these populations split into northern and southern Native Americans as they traveled by canoe down the Americas. And further genetic research has shown another genetic line that is Australasian in its genomes. A line that goes back to South Asia. Genetic research on all of these lines shows that Denisoven and Neanderthal genes are also found in the early populations in America.



Dr. Raff discussed some of the ancient sites in Siberia where the precursors of the First Americans lived; at the Yana site going back 30,000 years in Siberia, to the Upper Sun River Site in Alaska where two infants dating back to 11,500 BP have had their genetics studied to add to the complex story of who the First Americans were. As Dr. Raff explained, researchers concluded that the founding population of Native Americans began splitting from their ancestors in East Asia around 36,000 years ago. By 25,000 years ago, they had made a complete split. By 20,000 years ago, another divergence had happened, this time between the Ancient Beringians and the rest of the Native Americans. And within the next 3,000 to 6,000 years, the Native Americans further divided into Northern and Southern groups.

At the sites of Monte Verde in Chile, Paisley Cave in Oregon, and Page-Ladson in Florida, this entry date begins to take shape with new research and finds at these sites and perhaps others in the Americas that do not yet have the detailed proof that has been found at the above three sites.

Dr. Raff touched upon the new and very controversial finds made recently at the White Sands site in Nevada where the footprints of children have been found dated to 23,000 years ago which may lead to another line of early Americans we have not yet discovered the genetics for. But several researchers have voiced some doubts about the plant materials those making that claim were using in order to dispute the dates assigned to the footprints.

Here is the first article critiquing the age of the footprints: *New Research Questions Footprints Age* ■

Important Videos on YouTube You May Have Missed

Timeline - World History Documentaries

These video/documentaries are excellently created and very popular

This series tells us about indigenous peoples of the Americas before the Spanish explorer Columbus arrived. Each episode shows us via re-enactments about a particular subject. We learn about their art, architecture, archaeology, science and technology, etc.

"The Buried Secrets of the Native American Civilizations"

with 3.4 million views on YouTube

Click here to watch: *Buried Secrets*

"The Real History of the Americas Before Columbus"

with 7,237,572 views on YouTube

Click here to watch: *The Real History*

"How the Native Americans Built a Legendary Civilization"

with 1,034,186 views on YouTube

Click here to watch: *A Legendary Civilization*

"How the Native Americans Learned to Master Their Environment"

with 422,831 views on YouTube

Click here to watch: *Mastering Their Environment*

"Native America's Rich History of Science and Medicine"

with 224,383 views on YouTube

Click here to watch: *Science and Medicine*

Early indigenous people in North America were using the number 0 before any other people, had mapped the planets and stars, and had their own calendars and writing methods.

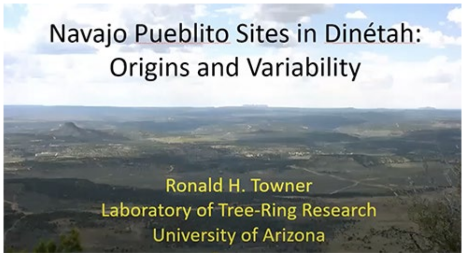
We also see how the herbs and plants that they used often are utilized in our modern drugs, as in the Yew tree bears components in Tamoxifen for cancer treatment today and the Willow tree has acetylsalicylic acid for aspirin.

Important Videos on YouTube You May Have Missed

Old Pueblo Archaeology Center's
"Third Thursday Food for Thought"

"Navajo Pueblito Sites in Dinétah – Origins and Variability"

by archaeologist **Ronald H. Towner**, PhD



Navajo Pueblito Sites in Dinétah:
Origins and Variability

Ronald H. Towner
Laboratory of Tree-Ring Research
University of Arizona

Pueblitos, as the name implies, are smal masonry structures. In the ancestral Navajo homeland of Dinétah in northwestern New Mexico, more than 250 such structures and associated hogans have been documented.

Once the pueblitos were thought to be the result of a massive immigration of Pueblo people fleeing the Spanish, but research in the past 2+ decades demonstrates significant variation in these sites over time. This presentation describes the variations and suggests important implications for understanding Diné (Navajo) cultural development and land use in the 18th century. Presenter Ronald H. Towner is an Associate Professor at the Laboratory of Tree-Ring Research and School of Anthropology at the University of Arizona. He earned his PhD at the U of A (1997) and MA at Washington State University (1986).

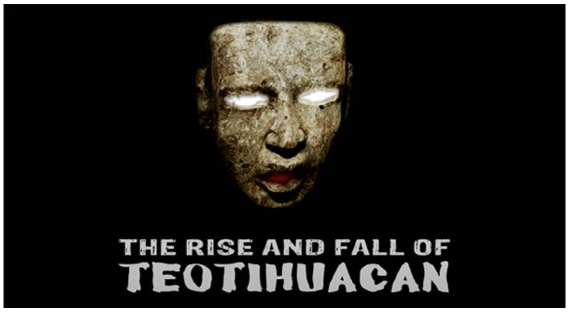
Click on this hyperlink to access the recording:

Navajo Pueblitos of Dinétah

Science and Cocktails on YouTube

"The Rise and Fall of Teotihuacan"

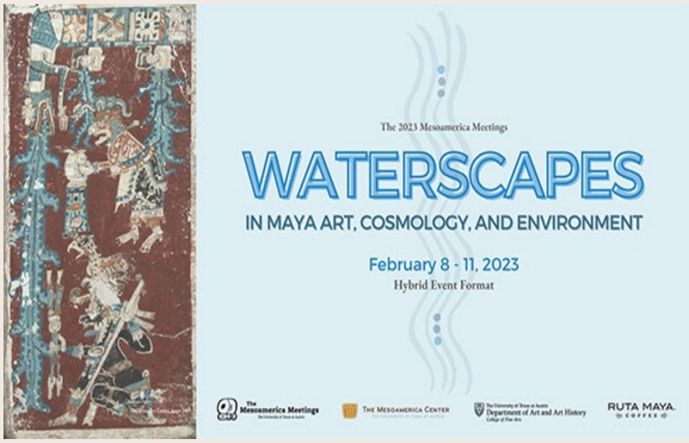
with **David Carballo**



Why did the earliest cities in pre-Columbian Mexico, such as Teotihuacan, emerge, expand, thrive, and eventually decline? David Carballo will provide an overview of archaeological research on the rise and collapse of Teotihuacan by focusing particularly in a southern district of the city, which was inhabited by a lower socioeconomic stratum and provides a perspective on the daily life of commoners as well as the broader processes of urban growth. He will describe hints of urban planning in the extension of the city's central artery, the Street of the Dead. Based on his new book *Urbanization and Religion in Ancient Central Mexico*, he will discuss the religious practices and beliefs of the different civilizations that inhabited Teotihuacan and the role of pre-Aztec pyramids such as the Pyramid of the Sun in Teotihuacan. Many of its secrets will be revealed.

Click on this hyperlink to access the recording:

The Rise and Fall of Teotihuacan



The 2023 Mesoamerica Meetings

"Waterscapes in Maya Art, Cosmology, and Environment"

February 8-11, 2023

We will be using a hybrid event format that incorporates both in-person and virtual elements. So, after two years, we will finally reconvene back at The University of Texas at Austin. For those who cannot make the trip to Austin to join us in person, we also plan to live stream the Symposium.

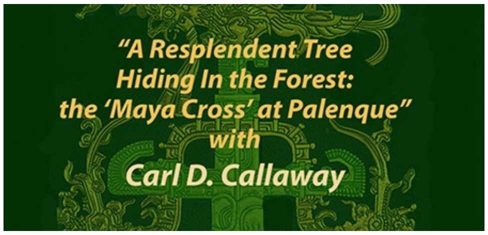
Visit utmaya.org *for updates and more info!*

Recent Live Streaming Events You May Have Missed

Aztlander December Zoom on YouTube

"A Resplendent Tree Hiding In The Forest: the 'Maya Cross' at Palenque"

with **Carl D. Callaway**, Austin Community College



Carl's talk reevaluated one of the most famous images in Classic Maya art, the figure known as the Maya cross from Palenque, Mexico, (250-900 CE). The cross is prominently displayed as the central motif on the sarcophagus lid from K'inich Janaab' Pakal I's tomb and on the inner sanctuary panel of K'inich Kan B'alam II's Temple of the Cross. The presentation offers new findings that revise past ideas about the cross' material identity, mythical origins, and proper name.

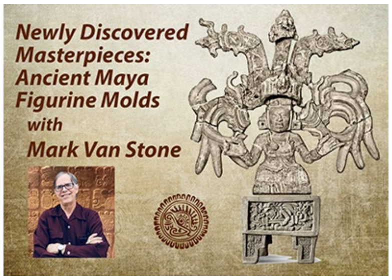
Click on this hyperlink to access the recording:

A Resplendent Tree Hiding In The Forest

Aztlander Program on YouTube

"Newly Discoverd Masterpieces: Ancient Maya Figurine Molds"

with **Mark Van Stone**



"The vast majority of Maya art we admire – jade, stelae, inscriptions, painted vases, books, mantles, palaces – was exclusively the province of elites. But mass-produced figurines were enjoyed by the hoi polloi, the proletariat. Their humanity touches us, and connects more directly than most of other Mesoamerican artforms. My Maya molds project began as a simple descriptive catalog but expanded into a 440-page investigation into the surprising role figurines played in Maya society" If you weren't there for the live program, check this out!

Click on this hyperlink to access the recording:

Ancient Maya Figurine Molds

Live Streaming Events on YouTube Channels

Each of these names are hyperlinks to access the channels of your choice.
Click on them, and they will open for you in another browser window.

Ancient Americas

Amerind Foundation

ArchaeoEd Podcast

Archaeology Cafe

Archaeology Southwest

ArchaeologyTV

Arizona State Museum

Mark Van Stone

Peabody Museum Lectures

Penn Museum

School for Advanced Research

Smithsonian Native American Museum

Teotihuacan: City of Water, City of Fire

The Archaeology Channel

We hope that you have enjoyed this issue of ***The Aztlander!***
Feel free to contact us to leave your comments and suggestions for future issues.

The Aztlander is announced to thousands of Ancient Americas enthusiasts. If you would like to donate to sponsor an ad for your business or organization, remember we provide hyperlinks, so folks can immediately access your website for products, services, book sales, etc.